

John Claudius Loudon,

F.L.S.

Vol. 243

Rev.d Sir John Thoroton

Ichnographia Ruſtica:

OR, THE

Nobleman, Gentleman, and Gardener's

RECREATION.

BEING

DIRECTIONS for the general Diſtribution of a Country Seat, into Rural and Extenſive Gardens, Parks, Paddocks, *&c.*

And a General

Syſtem of AGRICULTURE,

ILLUSTRATED

With great Variety of COPPER-PLATES, done by the beſt Hands, from the AUTHOR's Drawings.

Rev.d Sir John Thoroton

VOL. II.

By *STEPHEN SWITZER*, Gardener, Several Years Servant to Mr. *London* and Mr. *Wiſe*.

LONDON:

Printed for *D. Browne* without *Temple-Bar*, *B. Barker* and *C. King* in *Weſtminſter-Hall*, *W. Mears* without *Temple-Bar*, and *R. Goſling* in *Fleet ſtreet*, 1718.

TO THE

Right Honourable the

Lord *CONINGSBY*,

One of the Lords of his Majesty's Most Honourable Privy-Council,

THIS

TREATISE

Is humbly Dedicated

By your LORDSHIP's

Most obedient Servant,

Stephen Switzer.

Digitized by the Internet Archive
in 2017 with funding from
Getty Research Institute

https://archive.org/details/ichnographiarust02swit_0

THE

CONTENTS.

Introduction, Geometrical Instructions, &c.

CHAP I.

The Definition of a Point, and the Motion thereof, a Line P. 3

CHAP II.

Numerical Instructions for Gardeners, &c. containing what Arithmetick is necessary. 23

CHAP III.

Instrumental Instructions, and particularly the Use of Surveying Instruments 60

CHAP IV.

Of Court-Yards, and other Divisions in Rural Gardening. 135

CHAP

CHAP. V.

Of Terrace-Walks. 150

CHAP VI.

Of the Parterre. 183

CHAP VII.

Of Woods and Groves, Wilderneſſes, Parks, &c. 196

CHAP VIII.

Of Eſpalier Trees, Hedges, &c. and their Management. 225

CHAP IX.

Of Fruit-Gardens, Planting, Pruning, Grafting, &c. of Fruit-Trees. 233

CHAP X.

Of Orchards, Vineyards, and their particular Culture. 259

GEO-

Geometrical Inſtructions.

INTRODUCTION.

AMONGST the ſeveral Buſineſſes to which the Mathematicks is turn'd, 'tis certain that 'tis no where and in no Caſe more uſeful, plain, and diverting, than in this of Laying out of Gardens, Villa's, and large Eſtates: For however extenſively the Word *Geometry* is now apply'd, it was, at firſt, no more than the meaſuring out, diſtributing, and fixing, the Boundaries, or Encloſures, of the large Demeſnes, and the leſſer or more immediate Decorations of the noble Villa's and Granges of the ancienteſt and politeſt Part of the World, of which the well-known Relation of the Over-flowing of the River *Nile* undeniably proves.

To this I ſhall then apply what I have here to ſet down, as neceſſary to be learnt by all young Surveyors and Layers out of Ground, not mixing or confounding it with thoſe many Rules and Problems that are contain'd in other Books of the Mathematicks, out of which 'tis not eaſy for a Beginner, nor indeed for many Gardeners of ſome Standing, to collect what is uſeful and neceſſary to be known. I ſhall

I ſhall begin firſt with the Principles of Geometry, and ſo go on through the whole Practice thereof, as far as it relates to our preſent Purpoſe. And for our readier Introduction to it, we are to underſtand that *Geometry* is eſtabliſh'd upon three Sorts of Principles, *viz. Definitions*, *Axioms*, and *Petitions*.

Definitions are, firſt, brief Explanations of the Names and Forms of Lines, Superficies, *&c.* that are made Uſe of in all Parts of ſuperficial Menſurations and Schemes; and this is particularly uſeful in *Gardening*, *&c.* to enable a Perſon to ſpeak properly and intelligibly.

Axioms are ſelf-evident Truths, which there is the leaſt Reaſon to make uſe of, of any Thing us'd in the Mathematicks: As for Inſtance, that a Line three Foot, is equal to one, two, three, or four (ſeparately) of the ſame Length, *&c.* and is us'd on no other Account than to demonſtrate the Rationale of Addition, Subſtraction, either of Lines or Numbers.

And *Petitions* are clear and intelligible Demands, whereof the Execution and Practice requires not any Demonſtration; thus it is eaſy for the moſt unlearn'd, when he is bid to draw a ſtreight Line, or trace out a Circle, to do it, and ſuch other Things that are requir'd in this Diviſion. Theſe being the Preliminaries of Geometrical Practice, let us then begin on the definitive Part thereof.

CHAP.

CHAP. I.

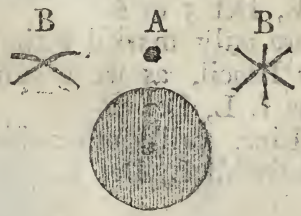
The Definition of a Point, and the Motion thereof, a Line.

§ 1. A Point is generally put as the first Principle in the Mathematicks, and that which of it self has no Part or Parts.

And by this we understand, that the Point hath neither Length, nor Breadth, nor Depth; and that also 'tis not sensible, but only intellectual, seeing there is nothing which falleth under Sense, which hath not a Quantity; and that there is no Quantity without Parts, which would altogether contradict this Definition. Nevertheless, as none can make any Operation, but by the Interposition of corporeal Things, they represent therefore the Mathematical Point by the Point Physical, which is the Object of the Sight, the smallest and least divisible to our Sense, and is made with the Point of a Needle, or with the End or Point of a Compass or Pencil, as the Point noted by A.

The Point central, or Center, is a Point by which a Circle is drawn; or rather it is the midst of a Figure, as C.

The Point secant, is a Point where the Lines do divide themselves, and which is ordinarily call'd a Section, as B B.



The Definition of a Line.

§ 2. The Line is a Length without Breadth, made by the Motion of a Point, and is of ſeveral Kinds, as it receives Difference of Motion.

The right or ſtrait Line, is that which is equally compriz'd within its Extremities, as A B, Def. 1.

The circular Line, is as plainly made from the round Motion of a Pair of Compaſſes, as C D, Def. 2.

The crooked Line, is that which turneth or wandereth from its Extremities by one or more Turnings aſide, as E F, Def. 3.

The compoſite or mix'd Line, is that Part of it which is crooked, and Part ſtrait, as is the Line G H, Def. 4.

The Line is alſo diſtinguiſh'd into finite and infinite, into apparent, and occult or hidden.

The Line finite, is a Line bounded at each End of a certain Length; ſuppoſe 100 Yards certain, or any other certain Dimenſion, whether ſtrait or circular, as are the Lines pointed at both Ends, and mark'd I I I I, Def. 5.

The infinite, is a Line of an undetermin'd Length, as K K, Def. 6.

The apparent, or Tract, is drawn very ſtrong, as either K — K, Def. 5 or 6.

The occult are only mark'd with the Point of the Compaſs or Pencil, as we commonly do our Hedge-Lines, as L L, Def. 7.

The ſpiral Line, call'd otherwiſe the *Voluta*, from *volvo*) is deſcrib'd L, Def. 8.

Plate II.d

Def. 1.st

Line 1.st

A B

Def. 2.d

Line 2.d

C D

Def. 3.d

Line 3.d

E F

Def. 4.th

Line 4.th

G H

Def. 5.t

Line 5.t

I I

Def. 6.t

Line 6.t

I I

Def. 7.th

Line 7.th

K K

Line 8.th

K K

L Line 9.th L

Line 10.th

L L

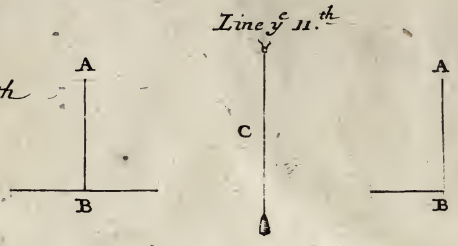
Def. 8.th

M N O

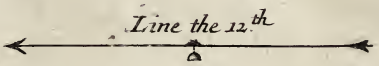


Sutton Nicholls sculp.

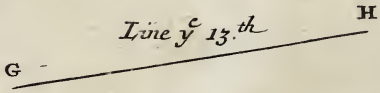
Def. 9.th



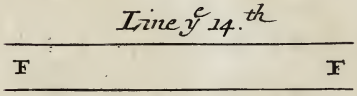
Def. 10.th



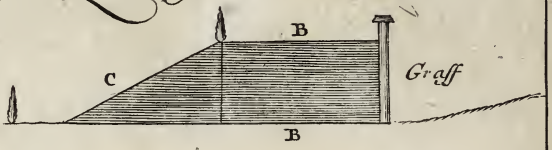
Def. 11.th

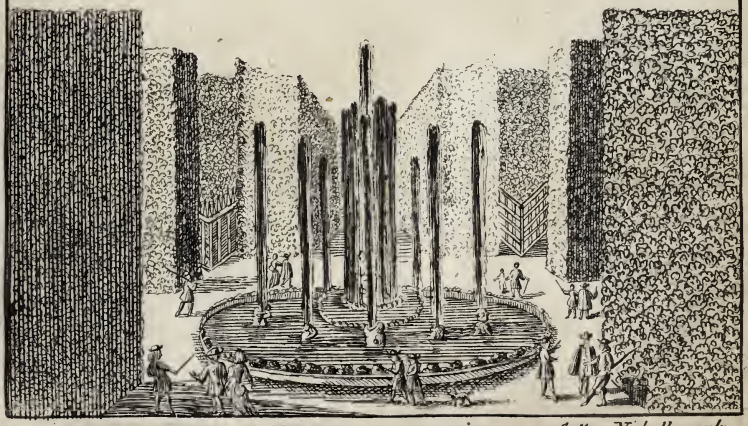


Def. 12.th



The Profile Lines of a Terras walk





Sutton Nicholls sculp.

The Line alſo receives divers Denominations, according to its divers Poſtions and Properties.

A Perpendicular is a right Line, that is made or expreſs'd by the Fall of a Plumb, or by the Elevation at right Angles of any Line upon the Middle or End of another, as is A, B, and C, Def. 9.

A Line horizontal, is a Line of an equal Poiſe, which inclineth it ſelf equally on the one Part and the other, as D E, Def. 10. and in Gardening is generally underſtood to be the Baſis, or Bottom of a Terras, Slope, *&c.* tho' it is properly any level Line, and may as well ſignify the Top of a Terras, or any other Plane, or dead Level.

An oblique Line, is neither horizontal, nor plumb, or perpendicular, but of a Byas or Slope; and is in Gardening, where Ramparts or Terras-Walks are made, apply'd to the Slope of them. This is call'd the Hypotheneuſe, or ſubtenſe Line, when we ſpeak of artificial Triangles, which is the Conſtruction of the Slope of a Terras; notwithſtanding in that famous Problem of *Euclid*, (for the Invention of which *Pythagoras* is ſaid to offer an Hecatomb) it is us'd for the Baſis of a rectangled Triangle.

This Line is ſimply demonſtrated by the Line G H, Def; 11. and the other two, and this, compos'd by the three Lines A B C, as they are ſeverally plac'd above.

Lines parallel, are thoſe that are of any equal Diſtance from each other; which, tho' they are extended never ſo far, are neither nearer nor farther off from each other, as are the Lines F, Def. 12.

Lines alſo receive their Names as they encompaſs, paſs through, touch, or diſſect a ſuperficial or ſolid Figure.

Side-Lines are thoſe which encompaſs any Sort of Figure, be it either a Square or a Polygon, as does A B C D, in Def. 13. Fig. 1.

A diagonal Line, is that which paſſeth thro' the very Center of a Figure, and which beginneth and endeth at two oppoſite Angles, as E F, Fig. 2. and G H, Fig. 3. Def. 14.

The Diameter has chiefly Relation to a Line that paſſes through, and touches the Center of a Circle, or Oval, as does the Line I K in Figure the 4th, and L M in Figure the 5th and 6th. In an Oval there are two, call'd the tranſverſe and conjugate Diameters.

The Chord, or ſubtenſe Line, is a Line that cuts off only a ſmaller Part of a Circle from a greater; or is more plainly like the String of a Bow, which is Part of a Circle, as is the Line N O, Figure the 7th; the Bow whereof is N O P, Figure the 7th; and the remaining Part of the Circle is R, Fig. 10.

A Line tangent, is that which toucheth any Figure, (whether circular or polygonar) without dividing it, and without being able to divide it, altho' it was prolong'd never ſo far, as are the Lines S T in Fig 8, 9.

A Line ſecant, is that which divideth, croſſeth, or traverſeth any Circle, Oval, or Polygonal Figure, the ſaid Oval or other Figure remaining whole; and is plainly demonſtrable by the Lines T U in Fig. 9, 10.

Def. 13.th

Fig. 3.d

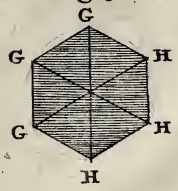


Fig. 2.d

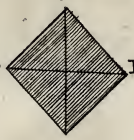


Fig. 1.st



Def. 14.th

Fig. 4.th

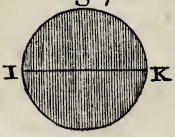


Fig. 6.th

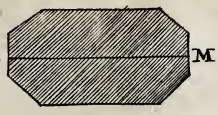


Fig. 5.th



Fig. 7.th

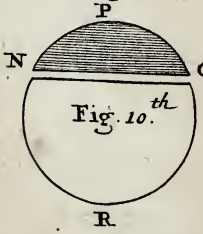
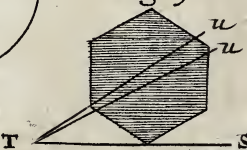


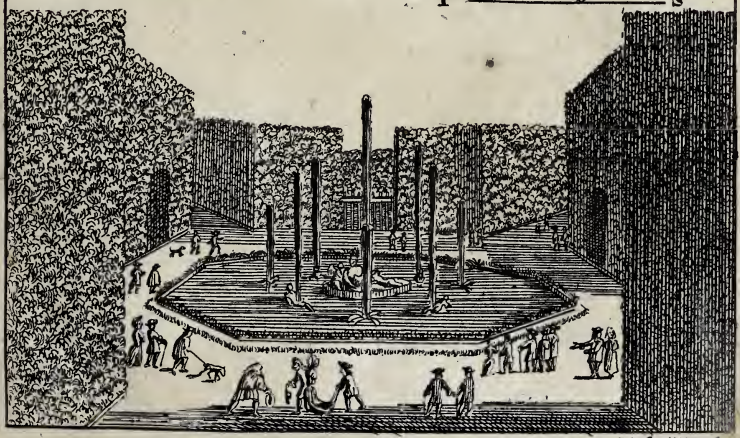
Fig. 8.th



Fig. 10.th

Fig. 9.th

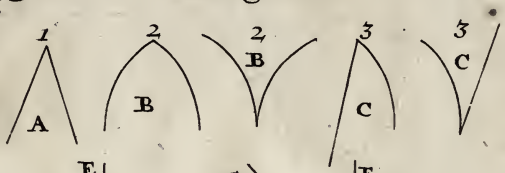




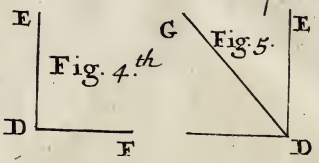
Sutton Nicholls sculp.

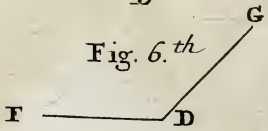
Def. 1.st

Figures



Def. 2.d

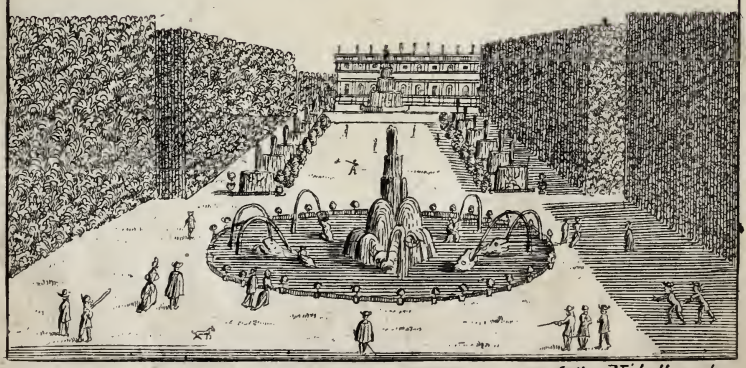




The Degrees whereby an Angle is measured

Fig. 7.th





Sutton Nicholls sculp.

The Definition of an Angle.

§ 3. An Angle is the indirect Meeting of two Lines at one and the same Point; or rather, it is the Space encompas'd between the indirect Meeting, or Concourse of two Lines, joining together in one Point, as A B C, Fig. 1, 2, 3.

When ever this Concourse is made of two strait Lines, it is call'd Rectilineal, as A, Fig. 1.

When it is made of two crooked Lines, it is call'd Curvilineal as B, Fig. 2.

But when it is made of one crooked and one strait Line, it is call'd Mixtilineal, as C, Fig. 3.

The Angle Rectilineal receiveth particular Denominations as it is more or less open, *(viz.)* right, acute or sharp, blunt or obtuse: So that these Terms, of Rectilineal, Curvilineal, and Mixtilineal, are in Respect of the Quality of the Lines, and those of right, sharp, and obtuse, in Respect of the Quantity of the Space encles'd within those Lines.

It is a right Angle, when one of the Lines is perpendicular upon another, as when E. is perpendicular to D, F Fig 4. and this exactly 90 Degrees of a whole Circle, which is suppos'd to contain 160 Degrees, as is demonstrable by Scheme. H I K L, Fig. 7.

It is an acute Angle, when it is less open than a right Angle, E D G which contains about 45 Degrees, and is mark'd also on the Scheme, H I K L, Fig. 7.

The Angle is obtuse, when it is more open than a right; that is, when 'tis above 90 Degrees; so that the right Angle, or 90 Degrees, and the acute Angle of 45 makes the obtuse Angle 135 Degrees, as appears in the Scheme, H I K L Fig. 7.

Of a Superficies.

§ 4. A Superficies is that which hath Length and Breadth without Depth, and according to Geometricians is the Production of a Line, as a Line is the Production of a Point.

And thus we muſt conceive, that the Line E F, in Fig. 2, moving on towards G, H, doth make the Superficies E F, G H, which is an Extenſion bounded with Lines, which hath nothing but Length and Breadth, without Depth or Thickneſs. And therefore it is the *Superficies*, Surface, and Boundaries of a Figure, if one conſider it in Reſpect of its Extremities, which are the Lines that cloſe it, and the Face that thoſe Lines make by their Motion.

Superficies are of ſeveral Kinds, not only in Reſpect to the Inequality and the Number of Sides they are compos'd of, but alſo of the Difference of their Surface, or Levels.

Thus A is a plain *Superficies.*
B. a convex *Superficies.*
C. a concave *Superficies.*

And the two latter are, in Gardening, very often call'd Amphitheatres; ſo that in this Caſe, in Reſpect of their Depths and Heights, C may be a concave Amphitheatre, and B a convex Amphitheatre, whilſt A is a Level Lawn Parterre. *&c.*

In fine, in the Conſtruction and framing Geometrical Figures, a Point is the Term or Bound of a Line; the Line the Term, or Bound of a *Superficies*, and the *Superficies* is the Term or Bound of a Body.

D. Fig. 10. Is the Plan of a large multangular Concave, or hollow Amphitheatre.

Def. 1.st

Fig. 1.



Fig. 2.



Fig. 3.



Def. 2.d

Fig. 4.



Fig. 5.



Fig. 6.



Def. 3.d

Fig. 7.



Fig. 8.

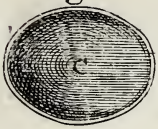
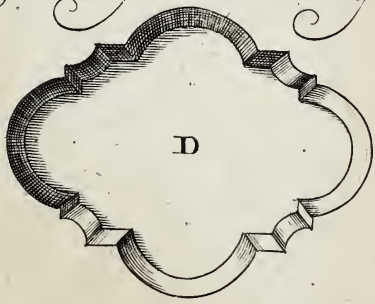


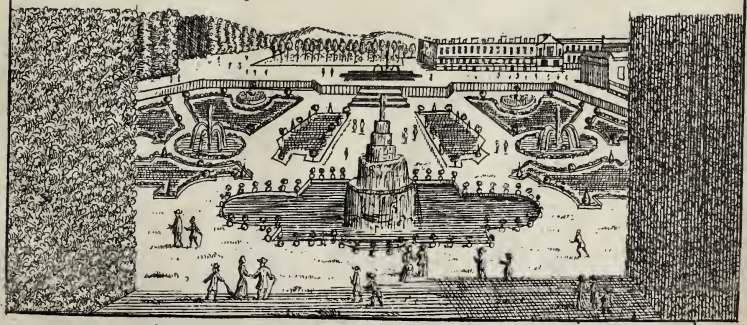
Fig. 9.



The Plan of a large Concave Amphitheatre

Fig. 10.





Sutton Nicholls sculp.

Fig. 1.

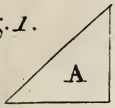


Fig. 2.

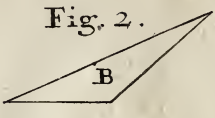


Fig. 3.

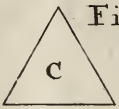


Fig. 4.

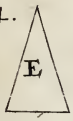


Fig. 5.

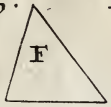


Fig. 6.



Fig. 7.

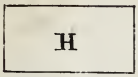


Fig. 8.

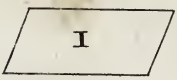


Fig. 10.

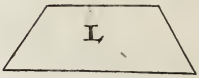


Fig. 9.



Fig. 11.

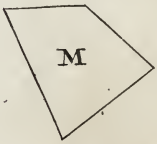


Fig. 12.

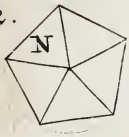


Fig. 13.

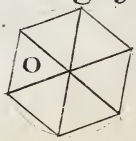


Fig. 15.



Fig. 14.

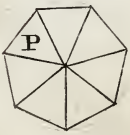


Fig. 16.



Fig. 17.

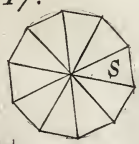


Fig. 18.

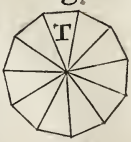
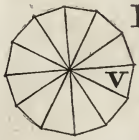


Fig. 19.





Sutton Nicholls sculp.

§ 5. Superficial Figures take their particular Names from the Number of Sides whereof they are compos'd; the firſt whereof (I mean Triangles) are diſtinguiſh'd by the Quality of their Angles, and by the Diſpoſition of their Sides.

A. A rectangled Triangle, has one right Angle, Fig. 1.
B. A Triangle Amblygon, has one obtuſe Angle, Fig. 2.
C. A Triangle Octagon, has three ſharp Angles, Fig. 3.

And is alſo in Reſpect of the Lines, call'd,

C. A Triangle equilateral, as is the ſame, Fig. 3.
E. A Triangle Iſoſcele, or equicrural, has two Sides equal only, as Fig. 4.
F. A Triangle Scalenous, has all his Sides unequal. *Vid.* Fig. 5.

Of Tetragonal or ſquare Figures.

G. A right Square is compos'd of four equal Sides, and four right Angles, Fig. 6.
H. A rectangled long Superficies, or long Square, has right Angles and equal Sides, Fig. 7.
I. A Parrellogram has parallel Sides, but is not always rectangled; and both theſe laſt Figures are call'd Parrellograms, Fig. 8.
K. A Rhombus, or Lozenge, is a ſquare Figure which has four Sides equal, but not the four Angles, Fig. 9.
L. A Rhomboid has its Sides parallel, without being equiangular or equilateral, Fig. 10.
M. A Trapeze, or Trapezium, is neither parallel, equiangular, nor equilateral, *Vid.* Fig. 11.

Of the ſeveral Kinds of regular Polygonal Figures.

N. A Pentagon, or Figure of five Sides, Fig. 12.
O. An Hexagon, or Figure of ſix Sides, Fig. 13.
P. An Heptagon, or Figure of ſeven Sides, Fig. 14.
Q. An Octagon, or Figure of eight Sides, Fig. 15.
R. Enneagon, or Figure of nine Sides, Fig. 16.
S. A Decagon, or Figure of ten Sides, Fig. 17.
T. An Endecagon, or Figure of 11 Sides, Fig. 18.
U, A Dodecagon, or Figure of 12 Sides, Fig. 19.

Of crooked and Curvilineal Figures, and of Figures mix'd and compos'd.

A Circle is a Figure perfectly round, drawn or described from a Letter, from which the whole Circumference is of equal Distance. The Boundary Line whereof is call'd the Circumference, or otherwise, the circular Line that encloseth it. Fig. 1. Letter 4.

An Oval (*ab Ovo*, an Egg) is a crooked Figure drawn from many Centers; and which Diameters divide into two Equals, Fig. 2. This is also call'd an Ellipsis; but this Word, as well as the Word Oval, is more properly apply'd to Fig. 3. Letter B, near the Shape of an Egg.

A Demi or Semi-circle or Oval, is the exact half of a Circle or Oval, as is C D, Fig. 4. 5.

A Quadrant of a Circle, is the exact Quarter thereof, as E , Fig. 6.

A Segment or Part of a Circle, either more or less than the half or quarter of one, as is F. Fig. 7.

A Sector, or Section of a Circle, is contain'd within two Diameters, then half a Circle, as is G. Fig. 8.

Figures concentrical, or those which have one and the same Center, H H, Fig. 9. 10.

Figures excentrical are those which are contain'd in others of divers Centers, I I, Fig. 11, 12.

These being the most material Definitions, I pass now to the next Thing in Course to be known, which are the Axioms us'd in Geometry.

Fig. 1.

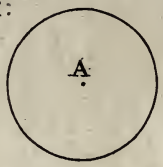


Fig. 2.



Fig. 3.

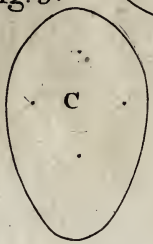


Fig. 5.

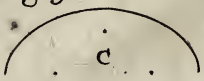


Fig. 4.

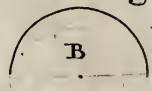


Fig. 6.

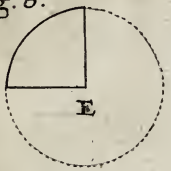


Fig. 7.

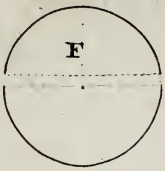


Fig. 8.

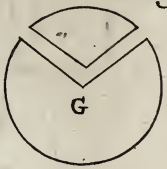


Fig. 9.



Fig. 10.



Fig. 11.

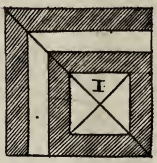
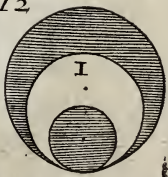
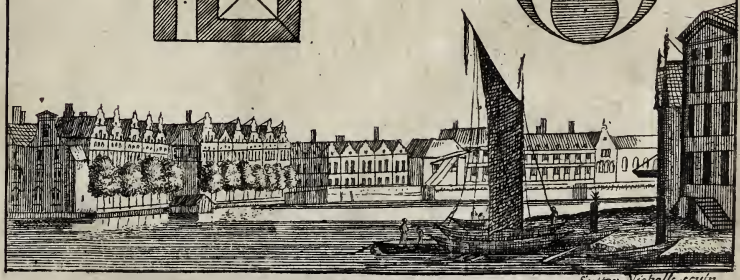


Fig. 12





Sutton Nicholls sculp.



Fig. 1.

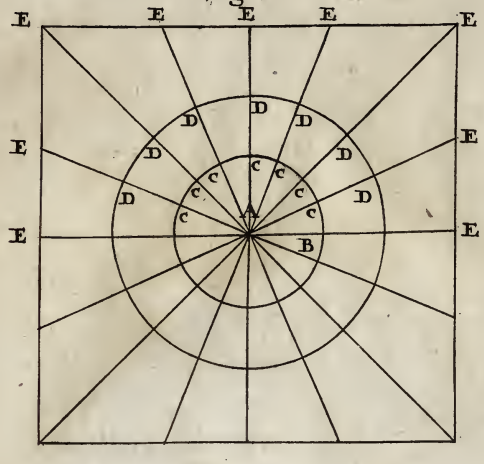


Fig. 2.

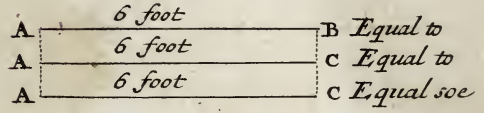


Fig. 3.

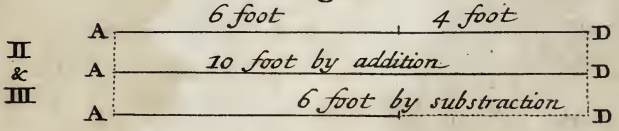
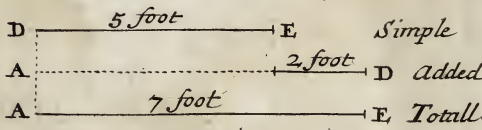


Fig. 4.





Sutton Nicholls sculp.

AXIOM I.

§ 6. *Things equal to one and the ſame, are equal amongſt themſelves.*

Thus the Lines A C, A C, which are equal to A B, are equal alſo between themſelves.

AXIOM II.

If to equal Things one ſhall add Things equal, all will become equal.

The Lines A C, A C, are equal.
The added C D, C D, are equal.
All of them A D, A D, are therefore equal.

AXIOM III.

If from Things equal one takes equal Things, the Remainder ſhall be equal.

Thus if from the equal Lines A D, A D.
One take the equal Parts A C A C.
The remaining Parts C D, C D.
ſhall be alſo equal.

AXIOM IV.

If to Things unequal, one add Things equal, the whole will be unequal.

If to the unequal Lines D E, D E.
One adds the equal Lines A D, A D.
The whole A E, A E.
ſhall be unequal.

Theſe Axioms may, at firſt Light, ſeem very ſtrange to a young Learner, who may ſuppoſe them to be more difficult than they really are; I ſhall therefore demonſtrate them by Lines number'd, which ſeems to me the beſt Way.

For the firſt 'tis no more, than that the Lines A C, tho' never ſo many Times repeated, or tranſpos'd to never ſo great a Diſtance, as they all appear to be equal to A B, ſo they are alſo ever amongſt themſelves: For Inſtance, being of ſix Foot in Length, they all of them are ſo, and equal to the firſt A B. The like may be ſaid of the 2d and 3d Axiom.

And for the 4th, nothing is more plain, that if one add an equal Line or Number of two Foot, to an unequal Line or Number of five Foot, the Produce muſt be ſeven Foot, which is ſtill an unequal Number; and if, as in the 2d and 3d, you add or ſubſtract the equal Line, or Number of four, from or to the equal Number of ten, the Product will be the equal Number of fourteen by Addition, or ſix by Subſtraction,

AXIOM V.

If from Things unequal one takes Things equal, the Remainder ſhall be unequal.

If from the unequal Lines A E, A E,
One take away the equal Line A D, A D,
The remaining Part D E, D E,
will be unequal.

Explanation. This is the very Reverſe of the 4th Axiom; ſince, if the equal Number, or Line of two Foot, be taken from the whole unequal Line, or Number of ſeven Foot, 'tis certain, the unequal Number of five will remain, which is the Purport of this Axiom.

AXIOM VI.

The Things that are double to one another, are equal amongſt themſelves.

Thus the Lines D D, D D,
Which are double to the Line A D,
are equal between themſelves.

Explanation. This is demonſtrated by the Lines in Fig. 7. where the Lines D D. of 40 Foot long, tho' they are double the Line D A, are nevertheleſs equal amongſt themſelves.

AXIOM VII.

The Things which are the half of one and the ſame, or of Things equal are equal amongſt themſelves.

Thus the Lines A D, A D,
Which are the half of the Lines D D, D D,
are equal between themſelves.

Explanation. This is again the Reverſe of the laſt Axiom, (*viz.* the VIth) for tho' the Lines D D; are double to the Lines A D, A D, yet they are nevertheleſs equal amongſt themſelves.

That which is ſaid of Lines may be alſo ſaid of Superficies and Solids; however trivial theſe Things may appear, 'tis on theſe our Mathematical Diſputants ground their Arguments; and tho' they are not very much us'd in our Way, they could not poſſibly be paſs'd over without manifeſt Injury to this Subject.

Fig. 5. t

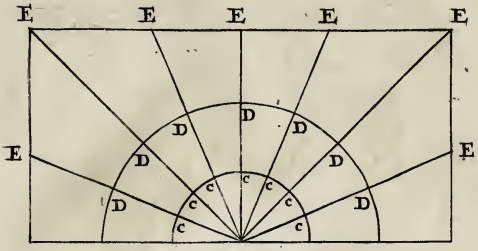


Fig. 6. Ax. VI. VII.

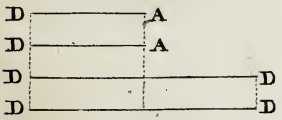
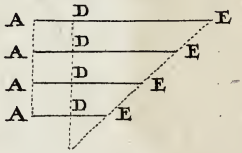
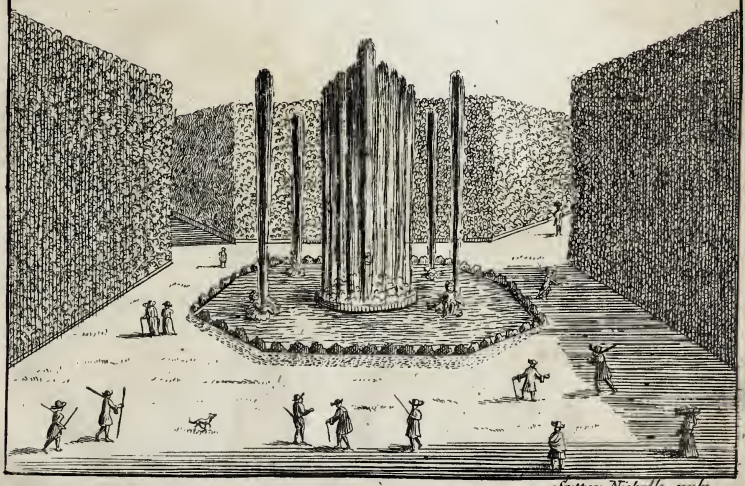
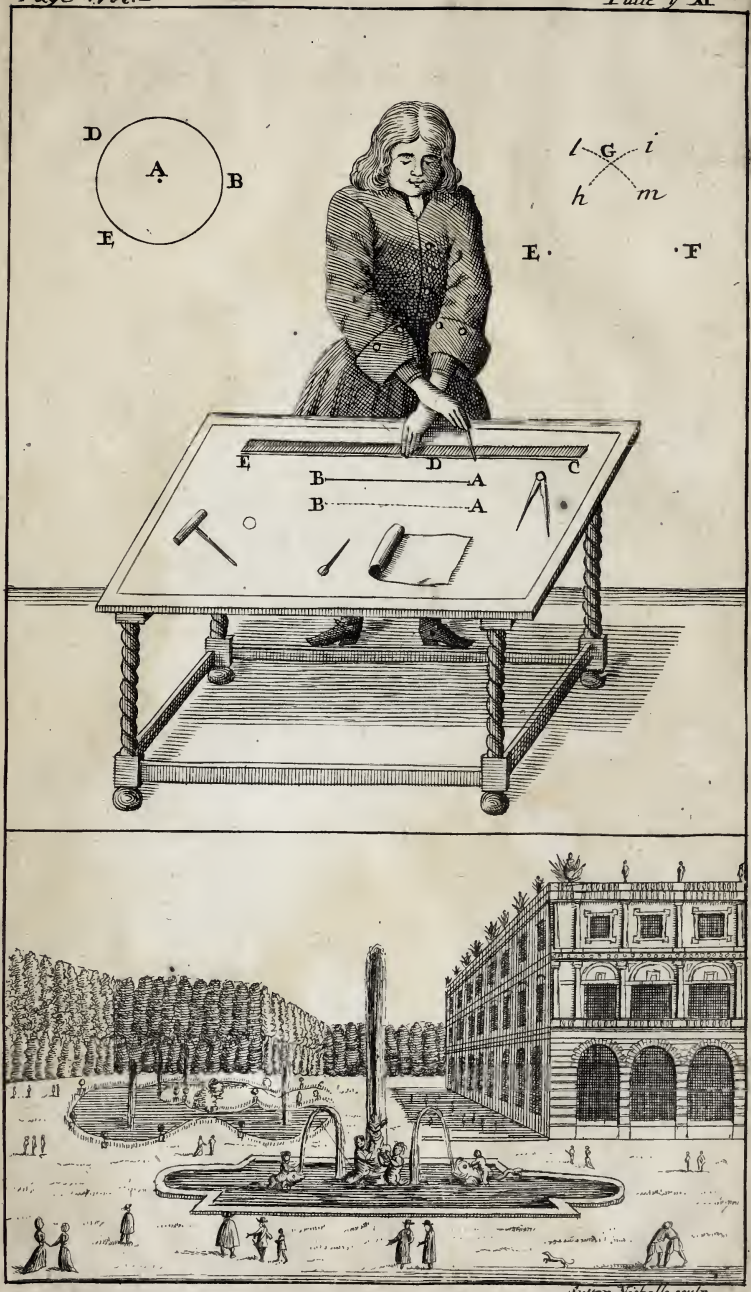


Fig. 7. Ax. V.





Sutton Nicholls sculp.



Sutton Nicholls sculp.

§ 7. *Positions, or Demands, in order to the putting of Geometry into Practice.*

DEMAND I.

Draw a strait Line from A to B.

The PRACTICE.

Apply the Ruler to the Points A B; and drawing the Pencil along by the Side of the Ruler, it will make the Line A B.

DEMAND II.

Enlarge infinitely the Line C D by E, *&c.*

The PRACTICE.

Join the Rule to the Line C D, continue the said Line C D, *ad infinitum*, towards, by, or beyond E, and it answers this second Demand.

DEMAND III.

Draw a Circle from a Point — A,
And the Interval ——— A B.

The PRACTICE.

Set one Point of the Compass at the Point given, A
Open the other unto the Point —— ——— B
Turn the Compass upon the Point ———— A
And drawing it from the Point ——— —— B
Describe the Circle ———— ——— B D E

DEMAND IV.

From the Points given ——— E and F,
Make the Section —— ——— G.

The PRACTICE.

Open the Compasses as you shall have Occasion, that the Opening may be more than the half Distance between E and F; and by this Opening from the Point E, draw the Arch ——— l m.
And from the Point F, the Arch — h i.
The Section at ——— ——— —— G
Is the Demanded,

PROPOSITION I.

§ 8. *To elevate a Perpendicular at any Point of a Line, particularly the Middle and the End.*

The Practice on Paper on the Middle, Fig. 1.

From the Point given C, touch the Line in D and E.
From the Point D E, make the Section I.
By which Means, C I shall be the two Points whereby the Line is to be drawn perpendicular.

The same on the End of the Line, Fig. 2.

From the Point A, draw the Arch G, H, M.
From the Point G, draw the Arch A H.
From the Point H, draw the Arch M N.
From the Point M, draw the Arch H N.
Then draw the requir'd Perpendicular A C.

There is not Occasion on Paper to make all these Arches; for which Reason I have put down Fig. 3. to shew you how to avoid it, as the other is to explain it.

Fig. 4. is another Way which almost explains it self, and the fifth are the Lines simply consider'd.

The Practice on the Ground.

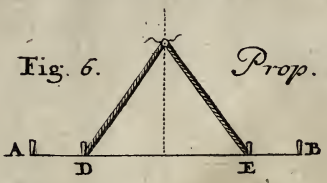
A Garden Line very plainly effects the same on the Ground, as the Compasses do on Paper; but our best Method is our *Garden-Square*, which apply'd to any Line, sets off a Perpendicular, as is evident by the Practice, Fig. 6, 7, 8.

But in case a Square is wanting, a Measure of eight and six Foot with a ten Foot from one End to the other, makes a good Square, as may be seen in Fig. 9. and it is by this that all right-angled Figures are set out in Gardens, and all other Works.

It is particularly by this, that all middle Lines, and grand Avenues and Walks, are set out from a House, *&c.*

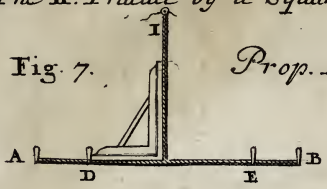
By a Garden Line Practice I.st on the Ground.

Fig. 6. *Prop. 1.*



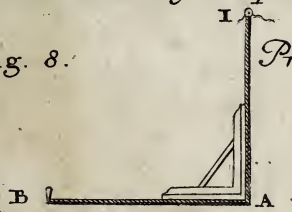
The II.d Practice by a Square.

Fig. 7. *Prop. 1.*



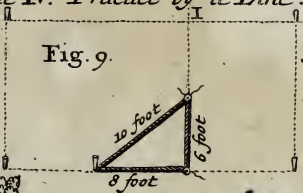
The III.d Practice by a Square.

Fig. 8. *Prop. 1.*



The IV.th Practice by a Line.

Fig. 9. *Prop. 1.*



Upon Paper

Fig 1.

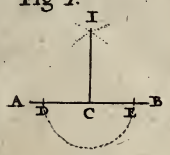


Fig 2.

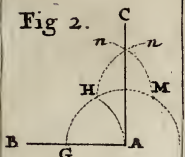


Fig 3.

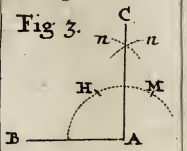


Fig 4.

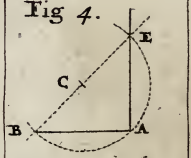
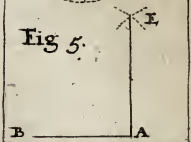
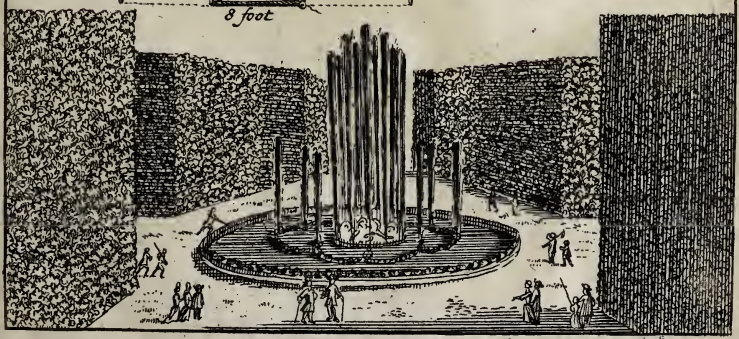


Fig 5.



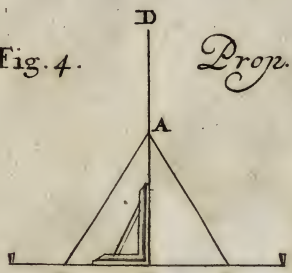


Sutton Nicholls sculp.



Practice the I.st upon ye Ground

Fig. 4. *Prop. 2.*



The II.d Practice

Fig. 5. *Prop. 3.*

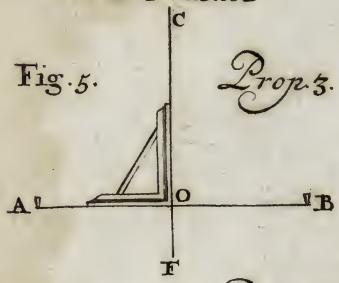


Fig. 6. *Prop. 4.*



Upon the Paper

Fig. 1.

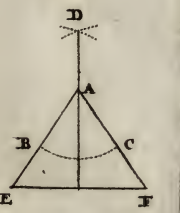


Fig. 2.

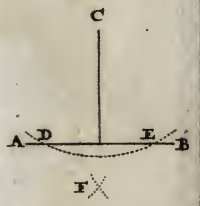


Fig. 3.





In this Page I shall comprize three Propositions, together with their Practice on the Ground.

PROPOSITION II.

To let fall a Perpendicular on the Point of an Angle.

Upon Paper, Fig. 1.

From the Angle A, describe at Pleasure the Arch B C; and from the Point B and C, make the Section D; and the Line E F is the Line requir'd.

Practice on the Ground, Fig. 4.

Move the Garden Square on the Base of Triangle E F, 'til the Point of the Square G, come over-right the Point A, then strain the Line to D.

PROPOSITION III.

To bring down a Perpendicular upon a Line given, or a Point without or near that Line.

Upon Paper, Fig. 2.

This is something like the former; for from the Point C you are to draw D E, cutting the Line A B at D and E; from the Points D and E, make the Section F; draw the Line C F, and the Line C O will be the Line demanded.

Practice on the Ground, Fig. 5.

In this Case either the Line or Square will do; the Method has been hinted at already, and the Scheme tells the rest.

PROPOSITION VI.

By a Point given, to draw a Line parallel to a right Line given.

Upon Paper, Fig. 3.

Let H F be the Lines given, add G the parallel Distance; fix the Compass in H and F, and describe the Arches G and I; by applying the Ruler to G and I, you may draw the Line requir'd.

Practice on the Ground, Fig. 6.

By applying the Square to the Points H and F, this Parallel is easily set off in G and I. *Vide* the Scheme, Fig. 6.

I shall likewise in this Page, bring in Propositions relating to the dividing of a Line, and an Angle into two Parts, and of the Manner of transferring of an Angle from the Paper to the Ground, &c.

PROPOSITION V.

To cut a right Line given into two equally.

Upon Paper Fig. 1. 2.

From the Point A draw the Arch C D, and without opening or shutting the Compasses, from the Point or End B, draw the Arch E F; and a Line or Ruler apply'd to G and H, will divide the Line A B equally in two at O.

Practice on the Ground, Fig. 6.

The doubling the Garden Line, to find the half Length of any Line is so common, that I need not repeat it, tho' this Method is more artificial, and is preparatory to the next.

PROPOSITION VI.

To cut an Angle into two equal Portions, upon Paper, Fig. 3.

From the Angle A draw at Pleasure the Arch D E, and from the Points D E make the Section O; then draw the Line A O, which is what is requir'd *(viz.)* dividing the Angle into two equal Parts.

Practice on the Ground, Fig. 7.

Being perform'd by a Line, as it is upon Paper by the Compasses, I need not repeat it.

PROPOSITION VII.

To make an Angle equal to an Angle given, or transfer an Angle from one Paper to another, or from Paper to the Ground.

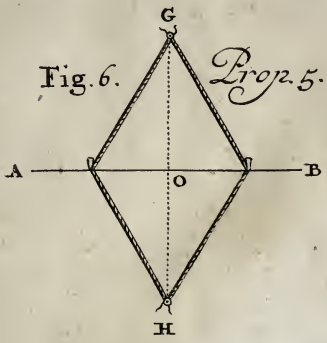
From the Angle D draw at Pleasure the Arch C G, and without altering the Compasses, from the Point D draw the Arch H O, and make the Arch H E equal to the Arch C G; draw the Line D E, and both Angles will be alike.

Practice on the Ground. Fig. 8.

Is the same as upon Paper. *Note*, this is very useful in setting of Diagonal Lines in Gardening, as may be seen. Fig. 8.

Practice the I.st on the Ground

Fig. 6. *Prop. 5.*



Practice the II.d on the Ground

Fig. 7. *Prop. 6.*

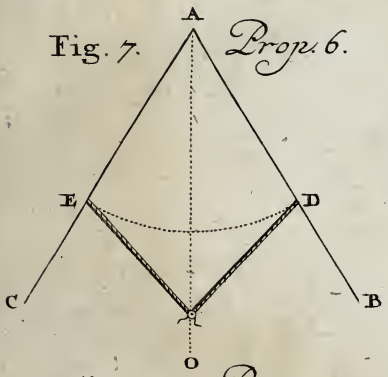
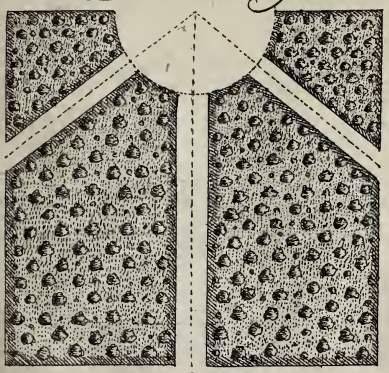


Fig. 8. *Prop. 7.*



Upon Paper

Fig. 1.

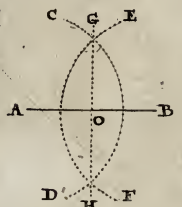


Fig. 2.

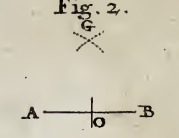


Fig. 3.

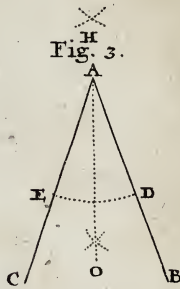


Fig. 4.

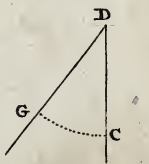
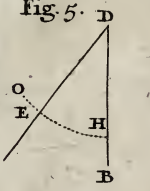
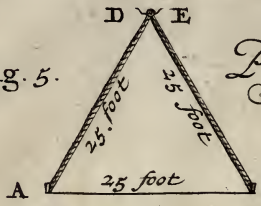


Fig. 5.



Practice the I.st on the Ground

Fig. 5.



Prop. 1.

Practice the II.d upon the Ground

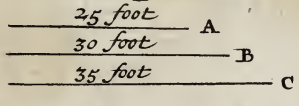
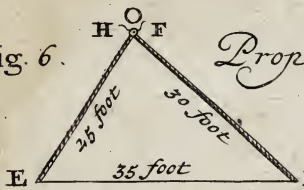


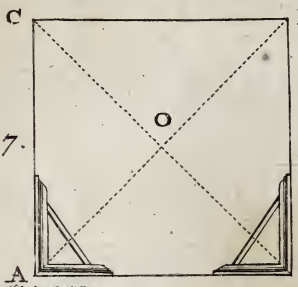
Fig. 6.



Prop. 2.

The III.d Practice on the Ground

Fig. 7.



Prop. 3.

Upon Paper

Fig. 1.

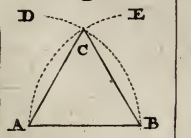


Fig. 2.

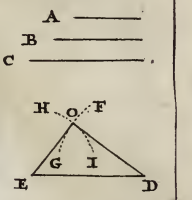


Fig. 3.

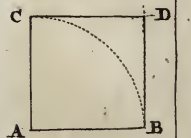
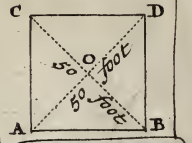
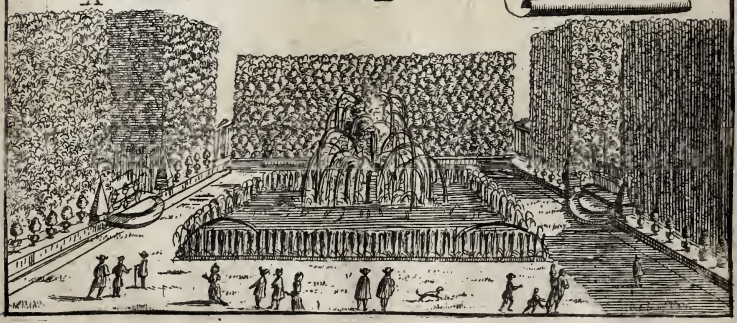


Fig. 4.





§ 9. Having put down what seems to be most necessary relating to Lines, I come now to shew how these Lines produce superficial Figures.

PROPOSITION I.

And first how to frame a Triangle equilateral, upon a strait Line given.

From the End A, and the Interval A B, describe the Arch B D; and from the End B, and the Interval B A, describe the Arch A E: and from the Section C draw the Lines C A, C B; and A B C shall be the equilateral Triangle demanded. Fig. 1.

PROPOSITION II.

But because there are several Sorts of Triangles, I shall in this Proposition shew, *how to make a Triangle from any three given Lines, supposing* A B C. Fig. 2.

Draw the strait Line D E, equal to the Line A A, from the Point D, and from the Interval B B; describe the Arch G F; from the Point E, and from the Interval C C, describe the Arch H I; from the Section O, draw the Lines O E, O D; the Triangle D E O, shall be compriz'd of three right Lines, equal to the three given Lines A B C. Fig. 3.

PROPOSITION III.

How to frame a Square upon one right Line given and bounded.

Elevate the Perpendicular A C from the Point A describe the Arch B C; from the Points B C, and from the Interval A B make the Section D; from the Point D draw the Lines D C, D E; and A B C D shall be the Square demanded.

Practice on the Ground.

This is so easy, and so like the Practice on Paper, it need not be repeated; however, I have put down the Figures, and shewn the Method of making a Square upon the Ground, and shall add,

PROPOSITION IV.

The Way to prove a Square.

Which is indeed only by measuring Diagonal or Cross-Ways; and if the Measure (supposing 50 Foot) is exactly alike, you may conclude your Square is true. *Vid.* Fig. 4, and 7. Otherwise it is false.

Before we proceed to ſhew the laying out Polygonal Figures or Figures of five, ſix, ſeven, or eight Sides, *&c.* it will be neceſſary we ſhould lay down the Methods of ſtriking out circular or crooked Figures, which are, generally ſpeaking, the Baſis of all Polygonal Superficies.

PROPOSITION V.

To find the Center of a Circle, the Center of which is loſt, or any other Way requir'd.

Place at Diſcretion the three Points A B C upon the Out-Line of the Circumference, and from the Points A B; make the Sections E and F; draw the right Lines E F, from the Points B C; make the Sections G H; then draw the right Line G H, from the Interſection and Center I, and from the Interval I A, and from this Center in the Middle of F I G, you may ſtrike your Circle. *Vid.* Fig. 1. and 2.

Practice on the Ground. Fig. G.

This is the ſame as on the Paper, as does plainly appear from Fig. 5.

PROPOSITION VI.

To ſtrike a Circle on Paper.

Keep the Foot of your Compaſſes in A, and trace the other Point round, it will make the Circle B C D E. Fig. 3.

Practice on the Ground. Fig. 6.

The ſame is perform'd by a Line, as was before taught of the Compaſſes. *Vid.* Fig. 6.

PROPOSITION VII.

A Spiral Line, tho' it is not properly a Superficies, yet, as it makes by its Voluta ſomething like it, I teach the Method of making it in this Place.

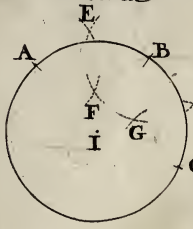
Suppoſe you would divide the Line L into eight Parts, divide it firſt into two Parts B I; after that into four Parts of each Side B C, E G, I; divide alſo B C into two, equally in A, and from the Point A, draw the Semi-circles B C, D E, F G, H I; and from the Point B, draw C D, E F, G H, I L, and that ſhall be the Spiral Line requir'd. *Vid.* 4. and 7.

On the Ground. Fig. 7.

The Practice is the ſame.

Practice y^e I.^st upon the Ground

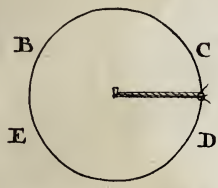
Fig. 5.



Prop. 5.

The II.^d Practice on the Ground

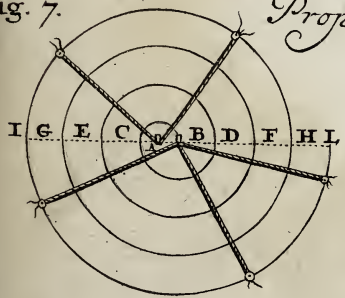
Fig. 6.



Prop. 6.

Practice the III.^d

Fig. 7.



Prop. 7.

Upon Paper

Fig. 1.

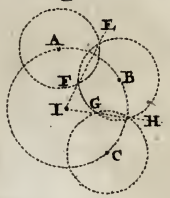


Fig. 2.

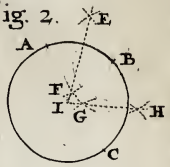


Fig. 3.

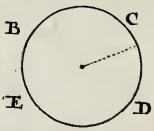
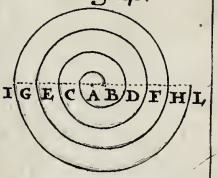
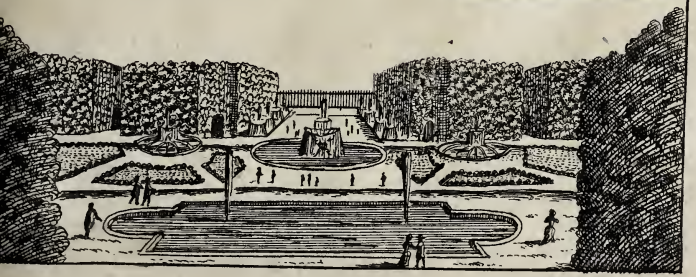


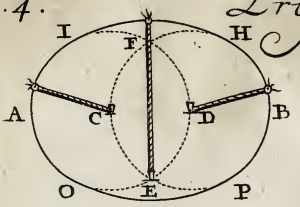
Fig. 4.





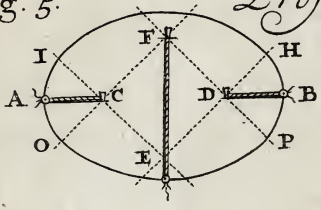
I.st Practice on the Ground

Fig. 4. Prop. 7.



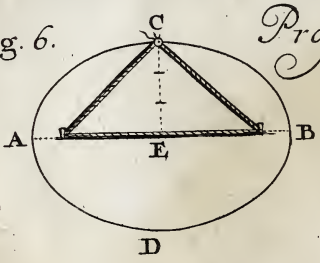
II.d Practice on the Ground

Fig. 5. Prop. 8.



III.d Practice on the Ground

Fig. 6. Prop. 9.



Upon Paper

Fig. 1.

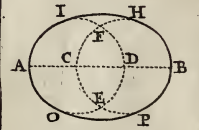
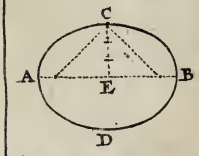


Fig. 2.



Fig. 3.





PROPOSITION VIII.

To describe an Oval upon a Length given.

§ 7. Divide the Length A B into three equal Parts, as in Figure 1; or into four, as in Figure 2, A B C D, and from the Points C D, and from the Interval C A, describe the Circles A E F, B C F, from the Sections E and F; and from the Interval of the Diameter E H, describe the Arches I H, O P, and A I H B P O shall be the Oval requir'd, in Fig. 1. And in Fig. 2, draw only the Diagonal Lines.

The Practice on the Ground

Is so near the same, that the Scheme makes it very plain. *Vide* Fig. 3.

PROPOSITION IX.

To describe an Oval that has two Diameters given; and this is generally call'd the Gard'ner's *Oval.*

Let the Diameters be A B C D, Lines fix'd at Pleasure; draw the Line A B, and in the Middle of that Line, at Right Angles, draw the Line C, by Intersections, from the Points A and B. Divide the Line C E into three Parts, one Part whereof set off from A, and the same from B; fix there two Pins, and by a Thread you may track out the Oval A B C D. Fig. 3.

Practice on the Ground. Fig. 4, 5.

This is easier done on the Ground, by a Line and Stakes, than on the Paper, by Reason there is more Room; so that your Work is done more easy and more certain; and this indeed is the best Method of laying out any Kind of Oval; for, tho' the first is easier made out on Paper than this last, yet this last is easier laid out on the Ground than the first.

Supposing, then, that the longest Diameter of your Oval be 90 Foot, and the shortest 60, the half whereof, C E, is shorter a Foot, a third whereof is 10 Foot, set off 10 Foot at each End A B, and put down there two Stakes, shall strike out the whole Oval. *Vide* Fig. 5.

We pass now to the Construction of Polygonar Figures.

PROPOSITION X.

To frame a Pentagon upon a given Line.

Suppose the Line B A; from the End A, and from the Interval A B describe the Arch B D F. Then elevate the Perpendicular A C; divide the Arch B C into five Parts equally, I D L M N. Then draw the right Line A D, cut the Base A B into two equally in O; elevate the Perpendicular O E from the Section E, and from the Interval E A describe the Circle A B F G H; bring five times the Line A B within the Circumference of the Circle, and you shall have a Pentagon regular, equi-angle, equi-lateral, A B F G H, Fig. 1 and 2.

The Practice upon the Ground. Fig. 5.

Is the same, and is particularly useful in Centers and Cabinets of a Garden or Wilderness; for when a Walk runs thro' or into one of them, you must first set off on each Side that Walk half the Width, as you may see on the Ground; and this will be the given Line, as in the Question; from which you may with Ease and Certainty make a proportionable Center or Cabinet. *Vide* Fig. 3.

PROPOSITION XI.

Within a Circle to make a Pentagon.

The Circle being given, there will not be so much Trouble as there was in the other. Draw then the two Diameters A B, C D, dividing themselves at Right Angles in E; divide the half Diameter C E into two equally in F, and from the Interval F A, describe the Arch A G from the Point A; and from the Interval A G describe the Arch G H. The Line A H shall divide the Circle into five equal Parts. *Vide* Fig. 3.

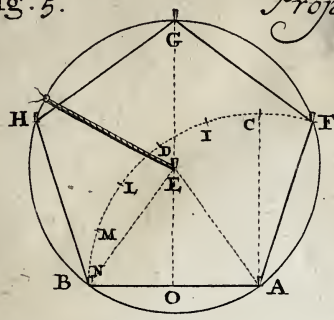
The Practice on the Ground

Is the same, the Line performing the Part of the Compass. *Vide* Fig. 6.

Practice the I.st upon the Ground

Fig. 5.

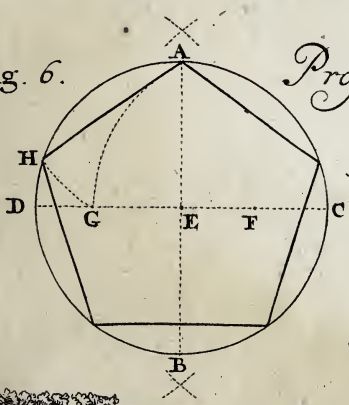
Prop. 10.



Practice the II.d on the Ground

Fig. 6.

Prop. 11.



Upon Paper

Fig. 1.



Fig. 2.

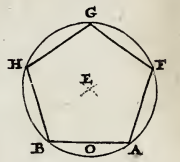
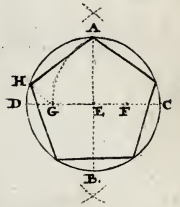
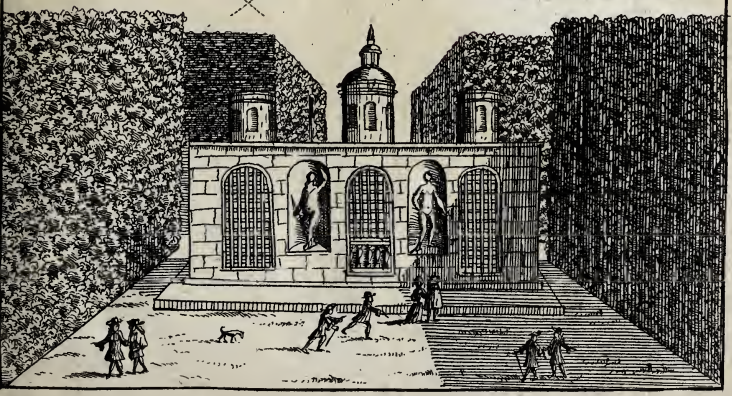


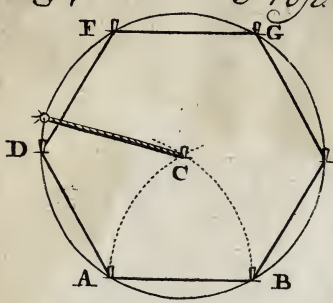
Fig. 3.





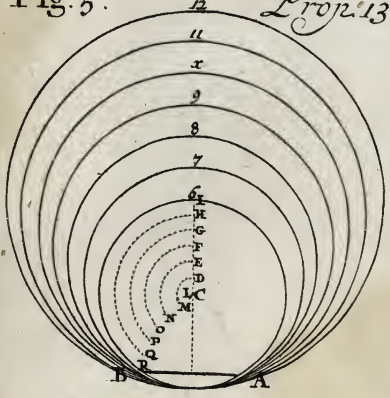
Practice the I.st upon the Ground

Fig. 4. Prop. 12.



The II.d Practice on the Ground.

Fig. 5. Prop. 13.



Upon Paper

Fig. 1.

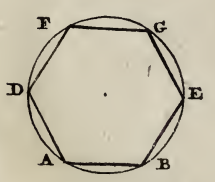


Fig. 2.

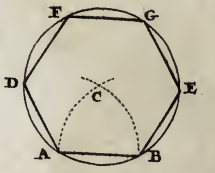
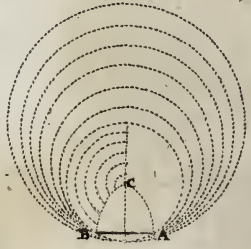
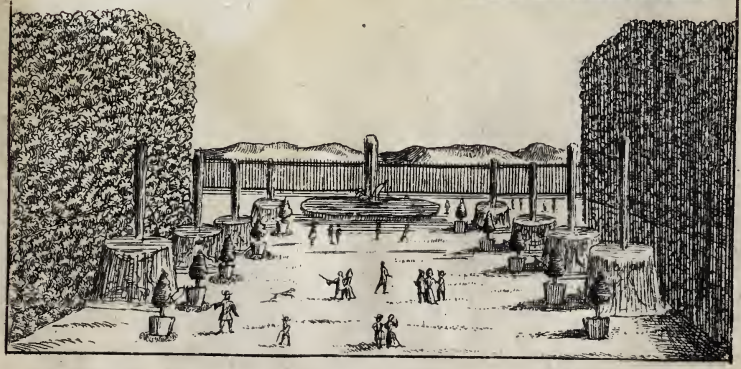


Fig. 3.





PROPOSITION XII.

To frame an Hexagon regular upon a right Line given.

Let A B be the right Line given, from the Ends A and B, and from the Interval A B deſcribe the Arches A C, B C; and from the Section C deſcribe the Circle A B E F G: Bring ſix times the Line A B within the Circumference, and you ſhall have an Hexagon regular, A B E F G D, fram'd upon a right Line given, A B. Fig. 1, 2.

N. B. It is to be here obſerv'd, that the Semidiameter of an Hexagon, is always one Side of it. And this is the eaſieſt to make of all Polygonar Figures.

This is alſo the Foundation from which all Polygonar Figures are fram'd, as will appear in Fig. 3.

The Practice on the Ground

Is every Way anſwerable to that on the Paper.

PROPOSITION XIII.

The Hexagon being the Foundation, on which all Polygonar Figures are built, here follows a Method, *Upon any right Line given, to deſcribe ſuch a Polygon as ſhall be requir'd, from an Hexagon to a Dodecagon, or Figure of* 12 *Sides.*

Cut the Line A B into two equally in O; elevate the Perpendicular O I from the Point B; deſcribe the Arch A C; divide A C into ſix Parts equally, M N O P Q R; this may make an Heptagon if you will. Then from the Point C, and the Interval of one Part, C M, deſcribe the Arch, D M D, ſhall be the Center, to deſcribe a Circle capable of containing ſeven times the Line A B; and ſo on, of any of the reſt, as will more plainly appear by a little Practice. Fig. 3.

The general Method of making and ſtriking out Polygonar Figures being thus fix'd, I ſhall illuſtrate and explain it farther by a few Examples, and then leave the Learner to his farther Practice therein.

PROPOSITION XIV.

Upon a Line given, to make a regular Heptagon, or Figure of ſeven Sides.

We muſt firſt ſuppoſe the Line A B deſign'd to make an Hexagon of; becauſe, as is before intimated, the Hexagon is the Figure, from which all Polygonar Figures are made.

After having drawn a Line perpendicular to A B, from the Middle thereof Q, ſet the Compaſſes in A or B, and draw the Arch, A C, which divide into ſix equal Parts, and fixing the Compaſſes in C, extend them to Part 5; from whence you may deſcribe a little Arch; or rather transfer that Meaſure on the middle Line to Letter O, and that is the Center of the Heptagon. Having then deſcrib'd a Circle, upon that draw the Lines B A F G H I K, which will make ſeven Sides, equal to the ſingle one A B requir'd. Fig. 1, 2.

On the Ground

The Practice is the ſame, and ſo needs no Repetition. *Vide* Fig. 5.

PROPOSITION XV.

Within a Circle given to inſcribe an Heptagon.

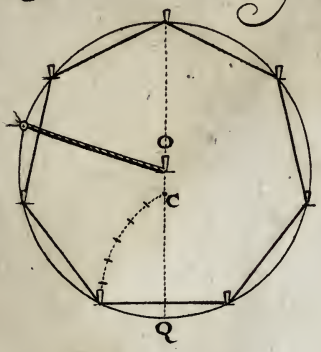
Draw half the Diameter I A from the End A, and from the Interval A I deſcribe the Arch C I C; draw the right Line C C, bear the Half, C O, ſeven times within the Circumference of the Circle, and you ſhall have the Heptagon requir'd, A m d, B g f e. *Vide* Fig. 3.

The Practice on the Ground

Is ſo near the ſame, that for farther Inſtruction I need only refer the Reader to the Scheme, Fig. 6.

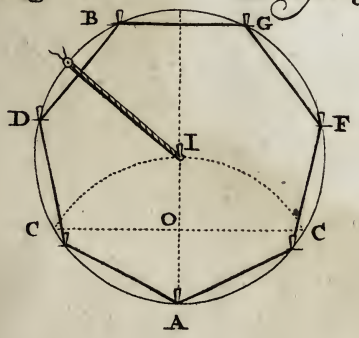
The I.st Practice on y.e Ground

Fig. 5. Prop. 14.



The II.d Practice on y.e Ground

Fig. 6. Prop. 15.



Upon Paper

Fig. 1.

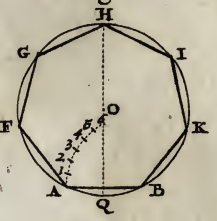


Fig. 2.

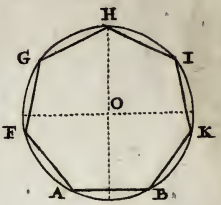
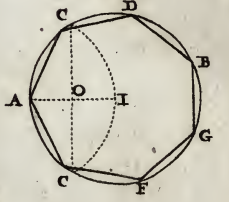


Fig. 3.

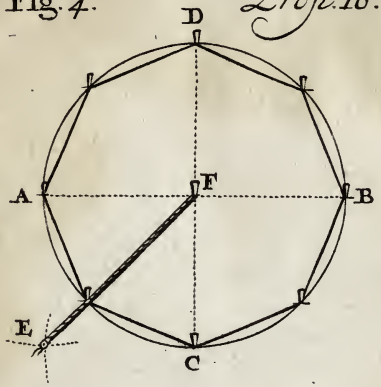






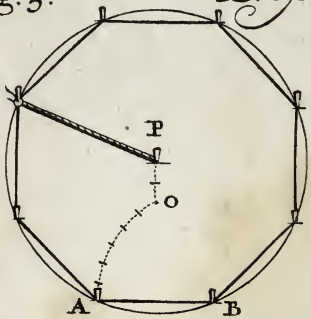
Practice y^e I.st upon the Ground

Fig. 4. Prop. 16.



Practice the II.d on the Ground

Fig. 5. Prop. 17.



Upon Paper

Fig. 1.

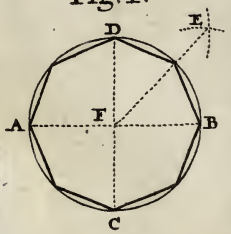
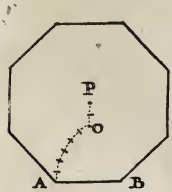


Fig. 2.



Fig. 3.





PROPOSITION XVI.

Within a given Circle to inſcribe an Octogon.

Firſt draw the two Diameters at right Angles, one to another, *viz.* the Line C D, at right Angles, with A B, this divides the Circle into a Square; then fix the Points of the Compaſſes in either of the Points, (ſuppoſe D) and mark out Part of an Arch; and then move the Compaſs-Point to the next Letter, (ſuppoſe B) and make an Interſection at E; apply the Ruler to that Interſection, and lay it likewiſe on the Center F, and the Place where it cuts on the Circle, ſhall divide D and B, or any other of the Letters, into two equally; and that is the Side of an Octogon requir'd. Fig. 1, 2.

The Practice on the Ground

Is the ſame, as appears by Figure 4.

PROPOSITION XVII.

To make an Octogon from a Line given.

Suppoſe the Line A B, (uſe the ſame Method as before, in making of an Hexagon) divide the Arch A O into ſix equal Parts, and from O ſet off two of thoſe Parts to P; that ſhall be the Center of a Circle, on which you are to ſet the requir'd Line A B, which will make eight ſtrait or right Lines, *viz.* an Octogon requir'd. *Vide* Fig. 2.

On the Ground, Fig. 5,

The ſame Way does; and is particularly uſeful, when a Garden-Walk croſſes or ends in a Center, or Cabinet.

In that Caſe, (as has been before mention'd) ſet off half the Width on the other, as a b c d, Fig. 5. and that ſhall be a given Line; and hence you may eaſily make a Center proportionable to the Walk that paſſes thro', or ends therein.

PROPOSITION XVIII.

Within a Circle given, to deſcribe an Enneagon, or Figure of nine Sides.

Let B C D be the Circle propounded, within which one would inſcribe an Ennea gon.

The Practice upon Paper.

Draw the half Diameter A B from the End B, and from the Interval B A deſcribe the Arch C A D; draw the right Line C D onwards to F; make the Line E F equal to A B. From the Point E deſcribe F G, and from the Point F deſcribe E G; draw the right Line A G, and D H ſhall be the ninth Part of that Circle. Fig. 1, 2.

The Practice on the Ground

Being done by a Line, as the Practice on the Paper is by Compaſſes, there is little Occaſion to repeat it, but to refer to Figure 4.

PROPOSITION XIX.

A Line being given, to find the Center of a Circle, and to make an Enneagon, or Figure of nine Sides.

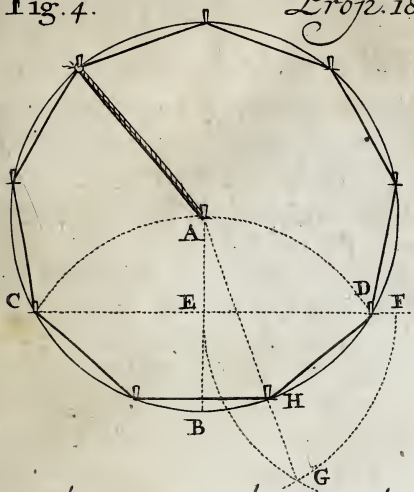
Draw the Line A B, and a Line perpendicular from the Middle thereof, as has been before taught; draw the Arch A O, and divide it into ſix equal Parts; or, which is leſs Trouble, take the half of it, and ſet up to P, which is the Center of this Circle, upon which you are to make this Enneagon, or Figure of nine Sides, every Side being equal to A B. Fig. 3.

The Practice on the Ground

Continues ſtill the ſame; and from this Rule of an Hexagone, is any Polygonar Figure to 20, 30, or 40 Sides, made upon a given Line; from what has been ſaid likewiſe of given Circles, may the Side of any Polygon be found; and with this I ſhall conclude this Point.

Practice y^e I.^st upon the Ground

Fig. 4. *Prop. 18.*



Upon Paper

Fig. 1.

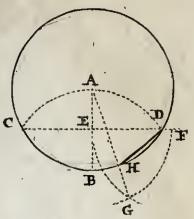
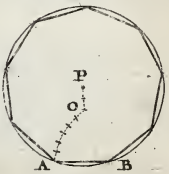


Fig. 2.

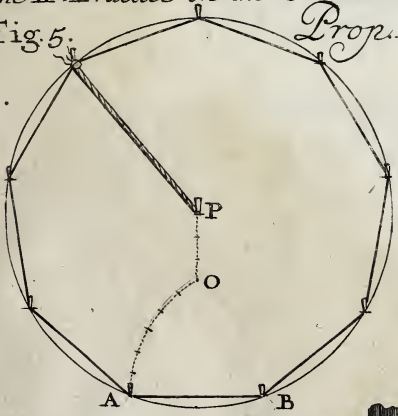


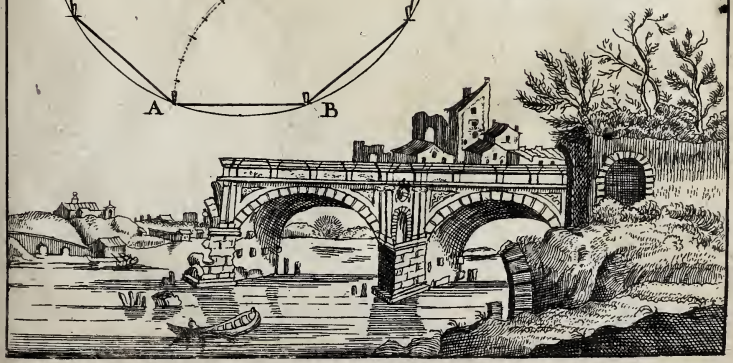
Fig. 3



The II.^d Practice on the Ground

Fig. 5. *Prop. 19.*





CHAP. II.

Numerical Instructions for GARDENERS, &c.

INTRODUCTION.

IT will not here be expected I should go back to Numeration, Addition, *&c.* that being in no case necessary, since there are but few that are so mean Proficients in Numbers as to require it: I shall therefore comprehend that little I have to say concerning Numbers in our Way of Gardening, with the *Golden Rule*, or *Rule of Three*, *Rules of Practice*, and with *Duodecimals*, or the Manner of Measuring and casting up Dimensions, *&c.* useful, as will hereafter be found, in digging, levelling, and accounting the Expences that accrue in Gardening; because in this both Stewards and Labourers are ofttimes at a Loss, and either the Master or Servant is very much the Loser, which is unjust to one, and both unjust and oppressive to the other.

Supposing then that a Gardener is beginning to make his Gardens, (tho' I must confess my self very much an Enemy to the levelling and straining of Nature beyond her due Bounds, that is too often seen in many Undertakings) there are several Divisions, that are absolutely necessary to be levell'd; such are all open Compartments of Parterre, Bowling-greens, Terrace-Walks, and the like, after the Levels are fix'd, as may be seen Fig. 7, p. 9, it will be then a proper Time for him to sit down and consult of his Expence. And how to go the nearest Way to work, preparatory to this, being very well instructed in Addition, Substraction, Numeration, Multiplication, and Division, he ought to learn how to take and cast up Dimensions, whether it be for the Removal of good Earth for planting, or of bad Earth for levelling, raising of Terrace-Walks, Mounts, or the like: And the first Thing is Duodecimals, or Cross-Multiplication; as follows.

Before we go to great Examples, it will be neceſſary to ſay ſomething of the Rules of Practice and Croſs-Multiplication, by which almoſt all Queſtions in this Matter are ſolv'd; and theſe two Rules are ſo interwoven with one another, that they are taught at one and the ſame Time.

The Learner is firſt to be inform'd, that by Duodecimals, or Croſs-Multiplication, is meant the multiplying Feet, Inches, and Parts, by Feet, Inches, and Parts, without Reduction, which ſaves a great deal of Labour and Trouble, and is done in fewer Figures.

He is alſo to underſtand, that the Rules of *Practice* ſhorten even that too, as will by and by very plainly appear. He ought then, firſt of all, to learn the Aliquot, or even Parts of a Foot, which is alſo applicable to a Shilling, 12 *d.* being a Shilling, as 12 Inches is a Foot. He is alſo to learn the Aliquot, or even Parts of a Pound. And theſe three will direct the neareſt Way of caſting up any Dimenſions or Accounts in Gardening.

Rules of Practice.

d. *Inch.*

1 or 1 is the 12th Part of a Shilling or Foot.
2 or 2 is the 6th Part of a Shilling or Foot.
3 or 3 is the 4th Part of a Shilling or Foot.
4 or 4 is the 3d Part of a Shilling or Foot.
6 or 6 is the half of a Shilling or Foot.
8 or 8 is the $\frac{2}{3}$ of a Shilling or Foot.
9 or 9 is the $\frac{3}{4}$ of a Shilling or Foot.

But as 5 *d.* 7 *d.* 10 *d.* 11 *d.* are not yet number'd, being odd, you muſt account them thus:

d. *Inch.*

5 or 5 is the $\frac{1}{3}$ and $\frac{1}{12}$ of a Shilling or Foot.
7 or 7 is the $\frac{1}{2}$ and $\frac{1}{12}$ of a Shilling or Foot.

d. Inch.

10 or 10 is the $\frac{1}{2}$ and $\frac{1}{3}$ of a Shilling or Foot.

11 is always accounted by casting the single Units away as you multiply: For Instance, if you multiply 11 Inches by 26 Foot, it is 26 Foot wanting 26 Inches; which is easily discover'd to be 23 Foot 10 Inches.

8 and 9 Inches or Pence, are likewise wrought by a double Number.

8 Inches by $\frac{1}{3}$ of a Foot twice repeated.

9 Inches by $\frac{1}{2}$ and $\frac{1}{4}$ of a Foot added together. But this whole Matter will be made very plain by the following Examples.

The Aliquot, or even Parts of a Pound.

1 *s.* is the 20th Part of a Pound.
2 *s.* is the 10th Part of a Pound.
2 *s.* 6 *d.* is the 8th Part of a Pound.
3 *s.* 4 *d.* is the 6th Part of a Pound.
4 *s.* is the 5th Part of a Pound.
5 *s.* is the 4th Part of a Pound.
6 *s.* 8 *d.* is the 3d Part of a Pound.
7 *s.* 6 *d.* is the $\frac{1}{3}$ Part of a Pound.
10 *s.* is the $\frac{1}{2}$ Part of a Pound.
13 *s.* 4 *d.* is the $\frac{2}{3}$ Part of a Pound.
15 *s.* is the $\frac{3}{4}$ Part of a Pound.

When, therefore, you are to multiply any of these aliquot Parts of a Pound with any Sum, you need not reduce, as the Method is too common, but divide by that Fraction.

For Instance, supposing that one Rod of Digging cost 9 *d.* what will 75 Rod cost? Now, 9 *d.* being the $\frac{1}{2}$ and $\frac{1}{3}$ of a Shilling, I first say,

	s.	*d.*
That the $\frac{1}{2}$ of 75 is —	37	6
and the $\frac{1}{3}$ of 75 is —	25	0
See that my Answer is —	62	6

Take

Take here a View of all the foregoing Numbers multiply'd by 75.

1 *d.* by 75 12)75

		s.	*d.*
6 3	which is	6	3

2 *d.* by 75 6)75

		s.	*d.*
12 $\frac{3}{6}$	which is	12	6

3 *d.* by 75 4)75

		s.	*d.*
18 $\frac{3}{4}$	which is	18	9

4 *d.* by 75 3)75

		s.	*d.*
25	which is	25	0

5 *d.* by 75 4)75

		s.	*d.*
18 $\frac{3}{4}$	which is	18	9
6)12 $\frac{3}{6}$		12	6
	In all	31	3

6 *d.* by 75 2)75

		s.	*d.*
37 $\frac{1}{2}$	which is	37	6

7 *d.* by 75 2)75

		s.	*d.*
37 $\frac{1}{2}$	which is	37	6
12) 6 $\frac{3}{12}$		6	3
	In all	43	9

Of

Or thus: 4)75

		s.	d.
18 $\frac{3}{4}$	which is	18	9
3)25		25	0
	In all	43	9

8 *d.* by 75 3)75

		s.	d.
25	which is	25	0
3)25		25	0
	In all	50	0

9 *d.* by 75 2)75

		s.	d.
37 $\frac{1}{2}$	which is	37	6
4)18 $\frac{3}{4}$		18	9
	In all	56	3

10 *d.* by 75 2)75

		s.	d.
37 $\frac{1}{2}$	which is	36	6
3)25		26	0
	In all	62	6

11 *d.* by 75 2)75

		s.	d.
37 $\frac{1}{2}$		37	6
4)18 $\frac{3}{4}$	which is	18	9
6)12 $\frac{3}{6}$		12	6
	In all	68	9

Without

Without the Trouble of multiplying by 9, and dividing by 12, which is the Method taught in moſt Schools.

But now let us ſee how many Pounds.

To divide by 20, is thus, (and which is commonly known) ſtrike off the Cypher from the 2 thus, 2|0, and divide the 62 6 by 20

Example.

2|0)62 *s.* 6 *d.*

The Anſwer is 3 *l.* 2 *s.* 6 *d.*

In like Manner if any one Thing were to coſt 3 *s.* 4 *d.* how much will 75 of the ſame coſt? You muſt then remember, that 3 *s.* 4 *d.* is the 6th Part of a Pound; then I refer you to the Work. Divide 75 by 6, thus:

6)75

12 $\frac{3}{6}$, or $\frac{1}{2}$.

So that the Anſwer is 12 Pound and $\frac{3}{6}$, or $\frac{1}{2}$ of a Pound, which is 10 Shillings; and that is the Anſwer, *viz.* 12 Pounds 10 Shillings.

View the round about Way, and I have done.

Firſt reduce 3 *s.* 4 *d.* into Pence, which are 40 *d.*

Multiply 75 by 40 — 3000

divide 3000 by 12 *d.* — thus 12)3000

Then by 2|0)25|0

12 *l.* 10 *s.* the Anſw.

This

This happens to be a pretty even Number; but here may be seen five times the Figures as are in the practical Way.

Here follow all the Shillings in a Pound under 10 Shillings, us'd after this practical Manner.

s.	*d.*			*l.*	*s.*	*d.*	*l.*	*s.*	*d.*
1	0	2\|0)75(3 $\frac{15}{20}$	which is	3	15	0			
2	0	1\|0)75(7 $\frac{5}{10}$	which is	7	10	0			
2	6	8)75(9 $\frac{3}{8}$	which is	9	7	6			
3	0	1\|0)75(7 $\frac{5}{10}$	which is	7	10	0	11	5	0
		2\|0)75(3 $\frac{15}{20}$		3	15	0			
4	0	5)75(15 0	which is	15	0	0			
5	0	4)75(18 $\frac{3}{4}$	which is	18	15	0			
6	0	4)75(18 $\frac{3}{4}$	which is	18	15	0	22	10	0
	2\|0	3 $\frac{15}{20}$		3	15	0			
7	0	4)75(18 $\frac{3}{4}$	which is	18	15	0	26	5	0
	10	7 $\frac{5}{10}$		7	10	0			
7	6	4)75(18 $\frac{3}{4}$	which is	18	15	0	28	2	6
	8	9 $\frac{3}{8}$		9	7	6			

8

s.	*d.*							*l.*	*s.*	*d.*	*l.*	*s.*	*d.*
8	0	5	)75(	15	0	} which is		15	0	0	} 30	0	0
		5		15	0			15	0	0			

s.	*d.*							*l.*	*s.*	*d.*	*l.*	*s.*	*d.*
9	0	4	)75(	18	¾	} which is		18	15	0	} 33	15	0
		5		15	0			15	0	0			

s.	*d.*							*l.*	*s.*	*d.*	*l.*	*s.*	*d.*
12	6	3	)75(	25	0	} which is		25	0	0	} 43	15	0
		4		18	¾			18	15	0			

s.	*d.*							*l.*	*s,*	*d.*	*l.*	*s.*	*d*
15	0	2	)75(	37	½	} which is		37	10	0	} 56	5	0
		4		18	¾			11	15	0			

It were needleſs to make any more Repetition on this Matter; if there ſhould be any other Number, 'tis eaſy, after a little Practice, to uſe it without the tedious Way of Reduction; ſo I paſs on.

Of Croſs Multiplication.

§ 2. Theſe Preliminaries, thus learnt by Heart, the Learner may proceed; and for the underſtanding this the better, we are to learn this ſhort Table.

That Feet multiply'd by Feet, are Feet.

That Inches multiply'd by Feet, every twelfth are Feet, and the Remainder are Inches.

That Inches multiply'd by Inches, every twelfth of the Product are Inches, and the Remainder are Seconds.

This is as far as we uſe in Gardening; but if any Perſon hath a Mind to go to a greater Exactneſs, I refer him to a very exact Treatiſe, and one of the firſt that was publiſh'd on this Subject, entitled,

titled, *Méllificium Menſurationis*; or, *The Marrow of Meaſuring*, by *Van Munday*.

Here follows an Example.

	F.	I.
by $\frac{4}{5}$ X $\frac{3}{6}$		
4 Foot by 5 Foot, is —	20	0
4 Foot by 6 Inches, is —	2	0
5 Foot by 3 Inches, is —	1	3
6 Inches by 3 Inches, is —	0	1 6
	23	4 6

But we never uſe the odd Parts in Gardening, they being of ſo little Account.

But from this let us go to the more general Uſe of theſe two Rules, where we ſhall ſee it often made Uſe of; I mean the Rule of *Practice*, and the Rule of *Duodecimals*, commonly call'd *Croſs Multiplication*.

QUESTION I.

§ 2. *How to meaſure and caſt up any uneven Ground, in a Parterre, Lawn, or ſuch like Diviſion where it muſt of Neceſſity be remov'd.*

I muſt own my ſelf the moſt averſe to the moving of Hills, or filling up of Hollows, imaginable; but there are ſeveral Caſes where it is impoſſible to avoid it, and that is, where the

the Parterre lies too high for the Floor of the Houſe, which is the Caſe in many Places, or where the Mold is to be carry'd off, for ſome good Uſe.

This moving of Earth, is commonly meaſur'd by the Foot Meaſure, and afterwards reduc'd into ſolid Yards, 27 whereof makes a Yard ſquare, or ſolid, being 3 Foot long, 3 Foot deep, and three Foot wide.

Theſe Dimenſions may be taken, before the Ground is carry'd away, by digging Holes down to the intended Level; but it is generally meaſur'd afterwards, by leaving little Hillocks about two Foot wide, to ſhew the Height the Ground was before the Work was begun.

Let us then put the Caſe that 'tis ſuch a Parterre, or Lawn, as is deſcrib'd *Fig.* 2, being 360 Foot long, 160 Foot wide, and of the ſeveral Depths under-mention'd, theſe Hillocks ought to be rang'd out, or judiciouſly ſtak'd out, as the Maſter and Undertaker ſhall beſt agree. We will ſuppoſe them to be only ten, but in a Peice of Ground of this Extent, there can't be leſs than 50 or 60; however, theſe ten will ſhew the Reaſon of the Thing as well as 50 or 60.

Let the Depths be, (1) 2 F. 3 In. (2) 1 F. 6 In. (3) 2 F. 1 In. (4) 2 F. 5 In. (5) 1 F. 3 In. (6) 2 F. 7 In. (7) 0 F. 8 In. (8) 0 F. 4 In. (9) 0 F. 3 In. (10) 1 F. 4 In. Theſe added together, will make 14 F. 8 In. Which being divided by 10, the Number of Depths makes near 1 F. 6 In. for the mean Depth of this

this unlevel irregular Peice of Ground: But it muſt be noted, that when you take theſe Depths, and find any two Dimenſions alike, you are to caſt away one of them, becauſe in the Account they make indeed more Figures, but are not of more Value.

But to return, let us now caſt up our Dimenſions.

	F.	In.	
Multiply ——	360	0	the Length.
by —— ——	160	0	the Width.
	21600		
	360		
and ——	57600		is the ſuperficial Content.
wh. multiply'd by	1	6	
by one Foot	57600		
by ſix Inches	28800		
and it makes	86400		the ſolid Content in Feet.

Let us now divide this ſolid Content in Feet by 27, the Number of ſolid Feet in a Yard.

27)86400(3200
54··

And the Content is 3200 ſolid Yards.

The Prices of moving Earth are various, according to the ſeveral Prizes of Labourers

in the Country; but, where they are allow'd 12*d. per* Day, a Yard of Sand, or other looſe Ground, may be dug and fill'd for 2*d.* $\frac{1}{2}$ or 3*d.* and of Clay for 3*d.* $\frac{1}{2}$ or 4*d.* Upon the whole, if you move it 20 or 30 Yards, it will coſt 5*d.* or 6*d.* or, if Clay, 7*d.* or 8*d. per* Yard. We will ſuppoſe the Queſtion in Hand to be 6*d.*

The Number of Yards 3200
The Price *per* Yard —— 6

To reduce it to Shillings take one half thus, } 16clo

Divide that by 20 —— } 80 o o Pounds.
and the Sum is —— }

And ſo much this will coſt the levelling.

QUESTION II.

But there are Pieces of Ground to be reduc'd, which are of irregular Widths, as well as Depths; the Method of meaſuring of which, will appear Plate 22.

The Widths and Depths being reduc'd into a regular Method, firſt by fixing ſome level Stakes round the Edge of the Pit, as a b c d, Fig. 3, Plate 22. Theſe Stakes, I ſay, being the exact Level the Ground is to be at the Top of the Pit, ſtrain the Line round; and whenever you have a Mind to find the Depths, ſtrain Lines croſs-ways likewiſe, or do

Fig. 1.

The Gen.ll Scetch of a Building

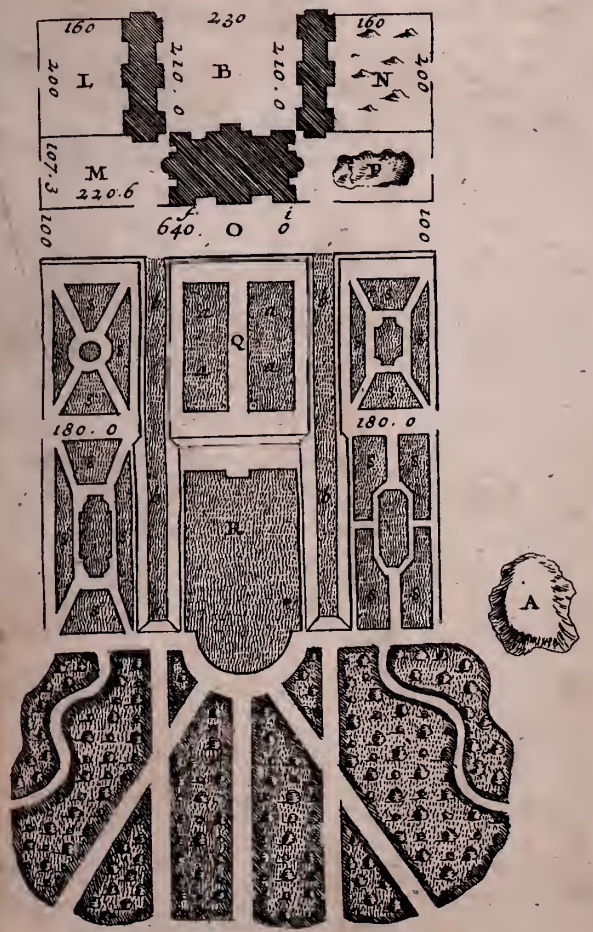


Fig. 2.

The Scetch of an Unleveld Lawn

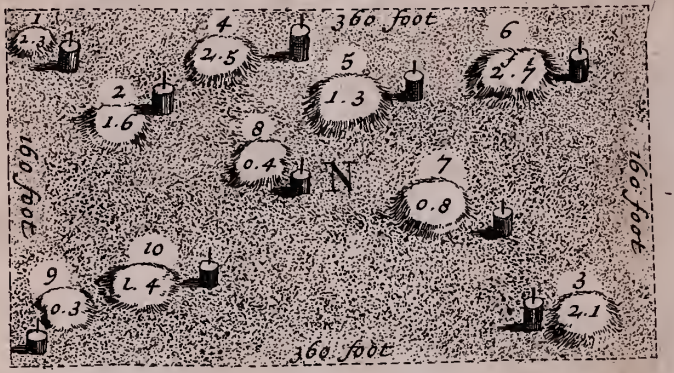


Fig. 3.

The Scetch of ye hollow of an Irregular Pit

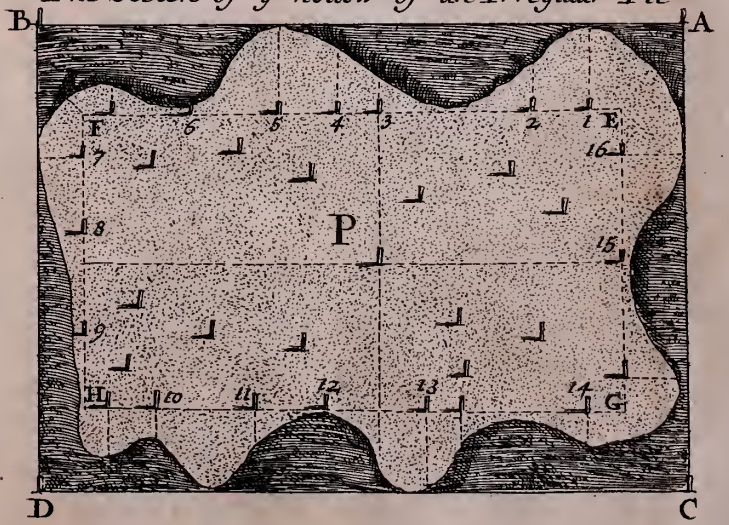


Fig. 4.

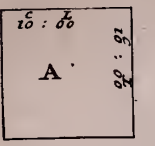


Fig. 5.

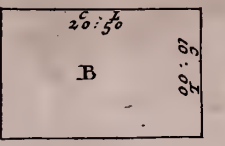


Fig. 6.

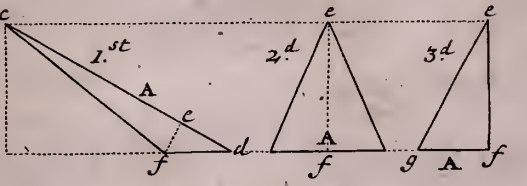


Fig. 7.

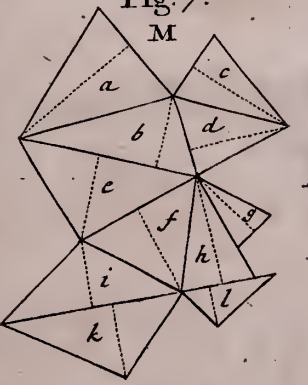


Fig. 8.

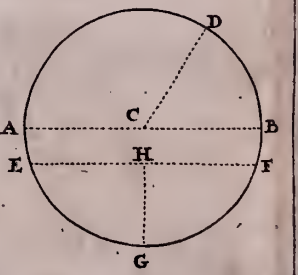


Fig. 9.

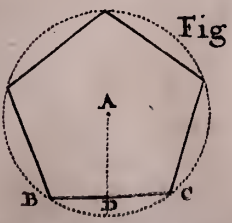
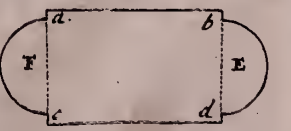


Fig. 10.



do it ſighting a-croſs; by which you will diſcover the middle Stake R (Fig. 3, Plate 22) to be 6 Foot 31 Inches more or leſs. Suppoſing then, you have taken the Depths, and reduc'd them as above, you are to ſet out an exact Square in the Bottom, that will near touch the Irregularities quite round; as ſuppoſe e f g h; by which Means, meaſuring a-croſs at ſeveral Places at Pleaſure, as at 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, adding all thoſe unequal Numbers together, as you did in the Depths, and dividing them by the Number of Dimenſions, ſuppoſe 16 more or leſs, the Queſtion will ſtand thus, ſuppoſing it to be a Hollow, that muſt be either reduc'd, or quite fill'd up.

	F.	In.	
	150	6	long.
	103	2	the mean Width.
and	6	2	the mean Depth.

See the Example.

	F.	In.	
	150	6	long.
	103	2	the mean Depth.

150 F. by 3 F.	450	
150 F. by 100 F.	150	
150 F. by 2 In.	25	. 0
103 F. by 6 In.	51	. 6
6 In. by 2 In.		1

	15526	7
	6	2 the mean Depth.

15526 by 6 F. deep	93156	
15526 by 2 In.	2587	. 8
6 F. by 7 In.	3	. 6
7 In. by 2 In.		1

Divide this by the Number of Feet in a ſolid Yard.	27)95747	. 3	(3546 ſolid Yards.
	147		
	124		
	167		
	5		

And this plainly appears to amount to 3546 ſolid Yards; which, if a Hollow, one would, if poſſible, avoid filling; as likewiſe, if it be a Hill, and not in the Way: Suppoſing you were to lay it into a regular Hollow

Hollow of 145 Foot 6 Inches long, and 106 Foot 3 Inches wide, let us reckon how we ſhall beſt order our Matters, that it may be reduc'd into our intended Form, without the Expence of carrying any of it away, or bringing any more in to compleat our Level.

Were the Sides of this Hollow perpendicular, the finding out a proper Depth would be the eaſier; but, ſince there are to be Slopes into the Hollow, it makes ſome Rebate in the Diſpoſition, and Depth of the Hollow. At firſt View, then, any Perſon of the leaſt Experience may ſee, that this Hollow we have been ſpeaking of, will be about 6 Foot deep; and, according to the common Allowance of three Foot horizontal to one Foot perpendicular, the Baſis of the Slope of each Side will take up 18 Foot, and the ſame at the Ends; ſuppoſing you allow the ſame Horizontal.

This being rightly underſtood, we ought then to make our Computation from the Middle of one Slope, to the Middle of the other.

You are then firſt to multiply the Length by the Depth, and divide that by the Number of Feet contain'd in the great Hollow, 18 *Foot at each Side and each End for the half Perpendicular of the Slopes; and it ſtands thus:*

See the Operation.

	F.	In.	
	127	6	long;
	88	3	wide.
127 Foot by 8 Foot ——	1016		
127 Foot by 80 Foot —	1017		
88 Foot by 6 Inches —	44		
127 Foot by 3 Inches —	31	9	
		1	
	11261	10	

The Sum of 11261 Feet being the ſuperficial Content of this deſign'd regular Hollow, (the Inches being rejected, as of little Account) we are in the next Place to divide the Content of the irregular Hollow thereby, and that will give the exact Depth.

As for Example.

11261)95745(8$\frac{5659}{11261}$, which is above $\frac{1}{2}$ an Inch.

5659

And by this we ſee, that this Pit we regularly reduc'd, is to be 8 Foot and a half deep: If it were to be a Hill that was to be reduc'd into the ſame Method and Figure, the ſame Calculation would ſuffice.

Of

Of the measuring of superficial Plans.

In the Course of this Chapter, it will be proper to shew the Method of measuring all Sorts of superficial Figures; not so much for its not being known, as for a Remembrance to all that practise Gardening; since these Things, in a Multiplicity of Business, are apt to slip out of any Body's Mind.

Now, it must be consider'd, that in Gardening, we have Occasion to take and cast up these Dimensions two Ways; first, in the general Survey of a Landskip in Chains, Perches, *&c.* and them into Acres; and, in a smaller Account, when those Figures are in Grass Plats, into Feet and Inches, and from thence into Yards or Perches. Of both these Ways I shall give Examples.

EXAMPLE I.

Of a Square and Parallelogram in large Land-Measure, Fig. 4, 5, *Plate* 23.

Let A be a true Square, each Side being 10 Chains 0 Links. Multiply 10 Chains 0 Links, by 10 Chains 0 Links, and the Sum is 1000000; from which cut off the five last Figures, and there remain just 10 Acres for the Square.

Again, in the Parallelogram B, let the Side A B, or C D, be 20 Chains 50 Links; and the Side A c, or b D, 10 Chains 0 Links. Multiply a b 20 Chains 50 Links, by a c 10 Chains 0 Links, and it makes 2050000; which is 20 Acres, 50000; but here being a Decimal Fraction, by the cutting off the five Figures, we are (which there was no Occaſion of in the laſt Dimenſion) to multiply it by 4, and cut off five Figures, and the Figures above five are Roods. Again, to find the Perches, multiply by 40, and the Figures toward the left Hand, above five, are Perches.

See the Operation.

20 50
10 00

Acres —— 20|500 00
4

Roods —— 2|00000
40

Perches —— 0|00000

So that the full Sum is 20 Acres, 2 Roods, 0 Perches.

How

How in ſmaller meaſuring in Gardening it is uſed as in the meaſuring of Graſs-Plats and other ſuperficial Figures.

Let A, then, be a true Square of 12 Foot 6 Inches; multiply 12 Foot 6 Inches by 12 Foot 6 Inches, and that gives the Content 156 Foot 3 Inches.

See the Operation:

```
  12 6
  12 6
 -----
 144
   6
   6 3
 -----
 156 3
```

Again, ſuppoſe in the Parallelogram B (Fig.5,Plate 23) the Sides a b, or C D, be 18 Foot 3 Inches, and the Width 12 Foot 6 Inches, as before:

```
  18 3
  12 6
 -----
 186
   3
   9 1 6
 -------
 198 1 6
```

the

the Content is 198 Foot, 1 Inch, and 6 Parts; but theſe Parts we generally throw away, except in fine Works.

Of Triangles, (Fig. 3, Plate 23.)

The Content of a Triangle is known by multiplying half the Perpendicular by the whole Baſe, or, *è contra*, half the Baſe by the whole Perpendicular; but the Dimenſions are taken as the Nature of the Triangle is; and thoſe three Kinds, in Fig. 6, give Light thereinto, being ſuch as all Sorts of Triangles compoſe.

When you have,then,pitch'd upon the Baſe, (which in every one of theſe is A at Right Angles) thereto draw or ſuppoſe a prick'd Line to run up to the Angle oppoſite to it, and that is the Perpendicular.

See the caſting up of one of them.

In the firſt Triangle, the Baſe c d is 22 Chains, 50 Links; and the Perpendicular f e is 3 Chains 50 Links. See it ſtated.

```
                11 25
                 3 50
              -------
                56250
                3375
              -------
Acres          3|93750
                    4
              -------
Rood           3|75000
                   40
              -------
Perch.        30|00000
```

and so of all the rest.

Now, if we apply this to Gardening, we sometimes have a Grass-Plat of this Kind, or other such like; but the 3d is the Area of a Terrace-Walk, taken at the End. Suppose it then to be the Horizontal Perpendicular and Hypoteneuse of a Terrace-Walk; take, first, the Base 6 Foot 4 Inches, and multiply it by half the Perpendicular of 15 Foot, which is 7 Foot 6 Inches, (for tho' this, as will hereafter appear, is not near the exact Proportion of this Work, yet it will serve to demonstrate our Proposition) and the Content will be 47 Foot 6 Inches:

```
 7 6
 6 4
-----
42
 2 4
 3 0
   2
-----
47 6
```

Of the general Uſe of Triangles, in meaſuring all ſtrait lin'd irregular Plans.
(Figure the 7th, Plate the 23d.)

It muſt be here obſerv'd, that a Triangle meaſures all irregular Plats, either large or ſmall, by reducing the whole Piece into Triangles, which Triangles are one of the three Kinds laſt mention'd, and muſt be ſo meaſur'd.

Suppoſe that *Fig. the 27th, Plate the 23d*, be an irregular Plan, with ſtrait lin'd Sides and Angles (for as for circular or crooked Sides, it is taught in *Fig.* 2. *Plate* 23.) that is to be meaſur'd in order to be levell'd, or any other Work common in Gard'ning, and reduc'd into Feet, Inches, *&c.* and after that into Yards, ſuperficial, or ſolid, or into ſuperficial Perches; not taking any Notice in this Place of large Land-meaſure, that being to follow Chapter of Inſtruments.

Having

Having taken the Plan of it on Paper, reduce it into Triangles, by drawing Lines from one Length to another, and leaving no irregular Square in the whole Work. Being thus reduc'd into Triangles, you are to pitch upon proper Lines for your Baſe; ſuch indeed are thoſe that are oppoſite to the wideſt Angle, then let drop, or you may from thence ſuppoſe a perpendicular Line; your Work is juſt ready to do as you did before, in the Example of Triangles.

There are ſome that adviſe the dividing and meaſuring ſuch Plats in the ſame Manner you would do a Trapezium; but that is almoſt the ſame as this, tho' not ſo intelligible, nor indeed ſo exact; I have therefore choſe this Way, tho' it is ſomething more Trouble: Yet, where two Perpendiculars have one common Baſe, as have the Diviſions *b* and *c*, *i* and *k*, *h* and *e*, you may add both Perpendiculars together, to ſave Trouble, and ſet them down, as in the Example.

I need not farther repeat the Method of taking, or caſting up the Dimenſions of this irregular Plat; but, in order to find the Content of the whole Field, I ſuppoſe the ſeveral Dimenſions, upon caſting up, are as follow:

	F.	In.
a ——	96	5
b }		
c } —	157	7
d ——	76	10
e }		
h } —	169	1
f ——	92	4
g ——	56	3
i }		
k } —	155	1
l ——	48	5
In all ——	882	0 Feet.
	96	0 Yards ſuperficial.

Now if you were to find the Content in Perches, you muſt divide it by 272, when in Feet, as 882.

See the Example.

$272)882\ 0\ (0\ 3\ .\ \frac{66}{272}$ near $\frac{1}{4}$

66

So that you ſee the Content is 3 Perches, and near a Quarter: This irregular Plat might be taken the ſame Way as it is in the 2d Figure; but I leave every one to chuſe which they like beſt.

Let us now proceed to Polygonar, and Circular Figures.

To

To find the Content of a Circle, or any Part thereof.

To find the Content of a Circle, one Way is, after you know the Diameter, to work by the Rule of Three, and say, as 7 is to 22, so is the Diameter to the Circumference; and then you are to multiply half the Diameter by half the Circumference, to find the Content.

But a better Way is to square the Diameter, and say, as 14 is to 11, so is the Square of the Diameter to the Content of the Circle.

Suppose, then, that the Diameter of the Circle A B, *&c. Fig.* 8. *Plate the* 23*d*, be 20 Foot, that 20 Foot multiply'd by itself, *viz.* 20 Foot, makes 400; say then, as 14 is to 11, so is the 400 to the Content of this Circle.

See the Work.

14 11 400

11

400

400

14)4400(314$\frac{4}{14}$ above $\frac{1}{4}$

20

60

4

So

So that the Content is 314 Foot and above a Quarter.

A Semicircle and Quadrant, or any Segment of a Circle, are meaſur'd the ſame Way that a whole Circle is, *viz.* half the Diameter, or Perpendicular, by half the Compaſs. In the foregoing Circle, if you would know the Content of that little Piece D C B. the Arch D. B. is 78 Foot and a Half, the half of it is 39 and a Quarter, which multiply'd by 100, the Semidiameter gives 3925 for the Content, and ſo of a Quadrant, *&c.* And it muſt be noted that all theſe Figures are in Uſe in Gardening; we break Circles, Semicircles, and Quadrants out of our Squares, for the greater Diverſity and Ornament thereof; but, becauſe it would be a Trouble to find the Diameter of the Segment of a Circle at all Times, I ſhall ſhew

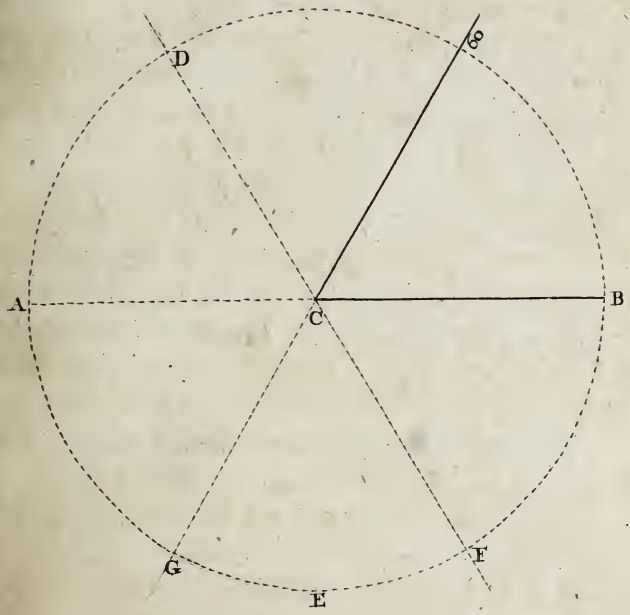
How to find the Content of the Segment of a Circle, without knowing the Diameter.

Let E F G be the Segment; the Subtenſe, or Chord-Line, is 170 Foot, the Perpendicular G H 50 Foot; now multiply $\frac{2}{3}$ of the one by the whole of the other, and the Product will be the Content.

The $\frac{2}{3}$ of 170 Foot is near 113, which multiply'd by 50, produces 5650 ſuperficial Feet; and that is the Content of that Segment, Portion, or Part of a Circle.

To

Fig. IV.



To find the superficial Content of an Oval.

The common Way is to multiply the long Diameter by the shorter, and from that Product to extract the Square-Root, which you may call a mean Diameter, and then, as if you were measuring a Circle, say,

As 14 is to 11, so is the mean Diameter to the Content of the Oval; but this is not exact. A better Way is 1.27, that as $1\frac{27}{100}$ is to the Length of the Oval, so is the Breadth to the Content thereof. We may go nearer, by making the Fraction larger, and say, as 1.27324 is to the Length, so is the Breadth to the Content: But the first is near enough to our Purpose in Gardening.

Let an Oval, then, be 50 Foot long, and the Breadth, or shortest Diameter, be 37. Say as follows:

As 1.27 is to 50 so is 37 to the Content.

37
350
150

127)1850.00(1466

580
720
850

88

So that as 1.27 is to 50 the Length, ſo the Breadth 37 is 1456 Foot, the Content.

The Reaſon why I have, in the Dividend of this Sum, added two Cyphers, is to make it equal to the two Fractions in the Diviſor; and this I particularly adviſe the Reader of, becauſe he is not, perhaps, very well ſkill'd in Decimal Diviſion of Feet and Parts, by Feet and Parts. But if there had been five Figures in the Fraction of the Diviſor, I ſhould likewiſe have added five Cyphers in the Dividend, to ballance it. And thus much of circular Figures.

How to find the ſuperficial Content of regular Polygons, as Pentagons, Hexagons, Heptagons, &c.

Multiply half the Sum of the Sides by a Perpendicular let fall from the Center upon one of the Sides, and the Product will be the *Area*, or ſuperficial Content of the Polygon.

In the following, the Sides B C ſuppoſe to be 84 Foot, the Sum of the Sides 5, the Work will ſtand thus:

The Half of 420, which is the Product of 84 by 5, is 210; and this 210 multiply'd by 56 Foot, the Semi-diameter, or, as it is generally here call'd, the Perpendicular, gives 11760 Square Foot for the Content thereof. And this Way will meaſure any Figure, let it be

6,

6, 7, 8, 9, 10, or more Sides; so that I need not enlarge more on it.

I shall only give one Example more of Compound Figures, which are us'd very much with us in Gardening. Let it be Figure the 10th, Plate the 23d, compos'd of a Square and a Semi-circle at each End.

Having already taught how to measure a Square and a Semi-circle, there is the less Occasion to enlarge here. First measure the Square, and then the two Semi-circles, and adding them together, it gives the Content.

Thus the Length a b, or c d, 100 Foot, multiply'd by a c, or b d, 60 is 600, and the Semi-circles 196 Foot, make in all 796 Foot superficial in the *Area* of that Compound Figure.

I shall now finish this Chapter with a short Sketch of a Measuring-Book Abstract, and of a Bill, or Computation of Work to be done by any Gardener, *&c.* which are the original Foundation of Minutes for a Bill, or Contract, and for the Scheme and Schedule thereto commonly annex'd.

You are then, upon the Paper, if it be for an Estimate, or upon the Ground, if the Work be done, and it be a Bill, and not an Estimate, to measure the Length and Breadth of every Particular; and cast up, and place all the Dimensions in a correct Method, that you may the easier abstract them into general

Heads, and caſt them up into a Bill. You are likewiſe to place the Sketch, or Draught of the principal Part of your Garden upon a very ſmall Scale, (*Vide* Plate 22) that thereon you may place Letters to refer to upon any Occaſion, and to demonſtrate the Place where ſuch Work was done, and the ſeveral Diſtances that Earth was mov'd; for otherwiſe, ſhould there happen to be a Suit of Law, (which is the Caſe too often) the Matter can't be ſo well underſtood.

The Nature of a Meaſuring-Book.

Firſt divide your Octavo Leaf into ſix Parts, or Folds, one whereof is for the Margin, one for the Dimenſion taken, one for the Contents, and the other to explain the Place and Diſtance of every particular Work. This being done, title your Book thus:

Sept. 14, 1714. The Menſuration of ſeveral Works done (or to be done) for the Right Honourable the E— of ———, at *Belleau* in *Com. Linc.*

	F.	I.	F.	I.
The Earth fleec'd off the Plan of the Courts Building, and Terrace-Walks, and carted to a Leſtal at A, the mean Diſtance of carting being from B to A, Plate 23, Fig. 1, 1000 Foot.	620	0	8726	0
	380	0		
	1	0		

The

	F.	I.	F.	I.
The levelling and carying away of the hilly Ground from the Lawn at N, Fig. 2, Plate 22, to the Terraces on each Side the mean Distance, 100 Foot:	360	0	86400	0
	160	0		
	1	6		
The filling up a large Pit in the Garden markt P, with Clay dug, and brought from the Foundations of the House, the mean Distance being 100 Foot.	150	6	95745	0
	103	2		
	6	2		
The rough levelling of the two Courts L and N.	(2)200	0	64000	0
	100	0		
	1	0		
The rough levelling the Garden mark'd M, Fig. 1, Plate 23.	220	0	38340	0
	107	3		
	1	0		
The rough levelling of the great Court before the House *Northward*, mark'd B.	230	0	120750	0
	210	0		
	2	6		
The rough levelling of the great Terrace-Walk on the *South* Side of the House, mark'd o.	640	0	94000	0
	100	0		
	1	6		

	F.	I.	F.	I.
The rough levelling of the upper Parterre on the *South* Side of the Houſe, mark'd Q.	240	0	72000	0
	200	0		
	1	6		
The rough levelling the lower Lawn, or Parterre, on the *South* Side of the Houſe, mark'd R.	250	0	45000	0
	180	0		
	1	0		
The trenching the Quarters mark'd S S, *&c.* and throwing the Mold out of the Walks two Spit deep.	(2)600	0	216000	0
	180	0		
The earthing, raking, and turfing the Parterre Quarters, mark'd a a a a.	(2)210	0	29400	0
	70	0		
The earthing, raking, and turfing the Lawn, or lower Parterre of Graſs.	250	0	45000	0
	180	0		
The turfing the Side Terrace-Walks, mark'd b b b.	(2)620	0	86800	0
	70	0		
The middle Gravel-Walk.	2400	0	96000	0
	40	0		

The

	F.	I.	F.	I.
The gravelling the great Terrace.	640	0	25600	0
	40	0		
The Gravel-Walk at the lower End of the Parterre.	640	0	19200	0
	30	0		
The Walk at each End of the Parterre.	200	0	6000	0
	30	0		

There are many other Dimenſions that occur in an Undertaking; but theſe, I think, are ſufficient Specimens of what I would pretend to teach by this Section. I ſhall now proceed to abſtract thoſe Dimenſions into general Heads; wherein I muſt obſerve, that all Dimenſions of Clay, or any other Material in Gardening, are brought into one Head, if the Diſtance of Carriage be the ſame; as is alſo rough levelling, turfing, *&c.* when they are of one and the ſame Kind.

Divide, then, a Page, or Pages, at the End of your Book, into ſix Folds, one more or leſs may do, but ſo as they may contain the Contents of any of the foregoing Dimenſions, and proceed thus, beginning at the Beginning of your Dimenſions,

An ABSTRACT *of the ſeveral Particulars of this Menſuration.*

Mold dug and carted, 1000 F.	Rough levelling.	Trenching.	Earthing, raking, and turfing.	Gravel-Walks.
F. I.	F. I.	F. I.	F. I.	F. I.
8726 0	38940 0	216000 0	29400 0	96000 0
	120750 0		45000 0	25600 0
323 ſolid Yards	94000 0	24000 0 Yards ſuperficial.	86800 0	19200 0
	72000 0			6000 0
Coarſe Earth and Clay dug and mov'd, 100 F.	45000 0	794 $\frac{1}{2}$ or, 4362 Perches ſuperficial.	161200 0	146800 0
86400 0	378690 0		9922 Yards.	540 0 ſuperficial Perches
95745 0	14029 ſolid Yards.		or, 597 Perches.	
182145 0				
6746 ſol. Yds.				

The

The ſeveral Sums being thus brought into proper Heads, theſe Heads are the Articles for an Eſtimate, or Bill, and, after that, for Articles; and, as ſoon as they are plac'd in Order, and caſt (as before) the Contents in Feet is then given; and then, being divided, is brought into ſolid or ſuperficial Yards, or into Perches; which three Meaſures are, for the moſt Part, what the Gardeners reduce their Work to; and for that Reaſon I ſhall here ſubjoin a Table, *viz.*

9 Foot is a ſuperficial or ſquare Yard.
27 Foot is a ſolid Yard.
272 Foot $\frac{1}{2}$ a ſuperficial Perch.
As for ſolid Perches we uſe them not.

There are, indeed, in ſeveral Counties of *England*, Meaſures that differ from theſe already nam'd; the *North* Country Fall, or Rood, is 7 Yards, or 21 Foot, and that a fourth Part of their Acre, as they call it, *viz.* 28 Yards; but there is little Occaſion for me to run into theſe Diviſions, ſince they are eaſily brought to bear with thoſe afore-mention'd.

Of a Bill, or Eſtimate.

A Bill, or Eſtimate, depends on the Nature of the Earth, or Clay, *&c.* you have to work on, and on the Diſtance you move it; as for Depths, they are adjuſted in caſting up the Dimenſions; and as for the Diſtance of

of Carriage, when we ſay a mean Diſtance, 'tis a Length taken from the Middle of the Place where we take it from, to the Middle of the Place where we carry it to.

The Form of a Bill, or Eſtimate.

A Bill of ſeveral Works done for the Right Honourable the E— of ———, at *Belleau* in *Com. Linc.* 1715.

	l.	*s.*	*d.*
For 323 ſolid Yards of good Mold, fleec'd off from the Surface of the Buildings, Court-Yards, *&c.* and carry'd to a Leſtal 1000 Foot Diſtance, at 8 *d. per* Yard. ———	10	14	8
For 6746 ſolid Yards of coarſe Earth and Clay, dug out of the Foundations of the Houſe, and other Places, and carry'd to a large Pit in the *Weſt* Court, and to raiſe the Terraces at each Side of the Parterre; the mean Diſtance of carting being 100 Foot, at 8 *d. per* Yard. ———	224	17	4
For 14029 ſolid Yards of Ground rough levell'd, and ſome of it carry'd 20, 30, or 40 Foot Diſtance, at 2 *d.* $\frac{1}{2}$ *per* Yard. ———	16	18	2

For

	l.	*s.*	*d.*
For 794 Perches and an half superficial of trenching at two Spit deep, leaving the Crumbs, at 4 *d. per* Perch.	13	4	10
For 597 Perches of Turf, or Swath-Grafs, (laid down at the Work) accounting molding, raking, laying, and cutting it, at 10 *s. per* Perch.	24	17	6
For fpreading, laying, raking, and rolling fix times over of 540 Perches of Gravel, at 6 *d. per* Perch, the Gravel being ready dug and carted.	13	10	0

I might in this very Section have been very large and copious; but I could not fee the Neceffity of it, feeing thefe fmall Intimations will be fufficient for any Perfon that has any Thing of a Genius; as for thofe that have not, though they are Gardeners, other Kind of Works are more proper for them; fo I proceed to the next Chapter of this Treatife, *viz. Inftrumental Inftructions for Gardeners.*

CHAP.

CHAP. III.

Of the Use of SURVEYING INSTRUMENTS.

Gunter's *Chain.*

§. 1. THIS is the Chain that is generally made Use of by Surveyors, and contains in Length four Poles, or 66 Feet, and is divided into 100 Links; each Link is therefore $7\frac{92}{100}$ Inches. This Chain is, for greater Ease in reckoning, divided into ten Parts, by proper Brasses, denoting 10, 20, 30, 40, 50 Links, and back again from 50 to 10 Links.

The Surveying Scales.

FIG. 1.] THE Scale more particularly adapted to Surveying, is on one Side divided into six equal Parts, each of which Parts answers to a *Gunter's* Chain of 100 Links: At the End of this Scale is an equal

Fig. I.

A Diagonal Scale of Equal parts.

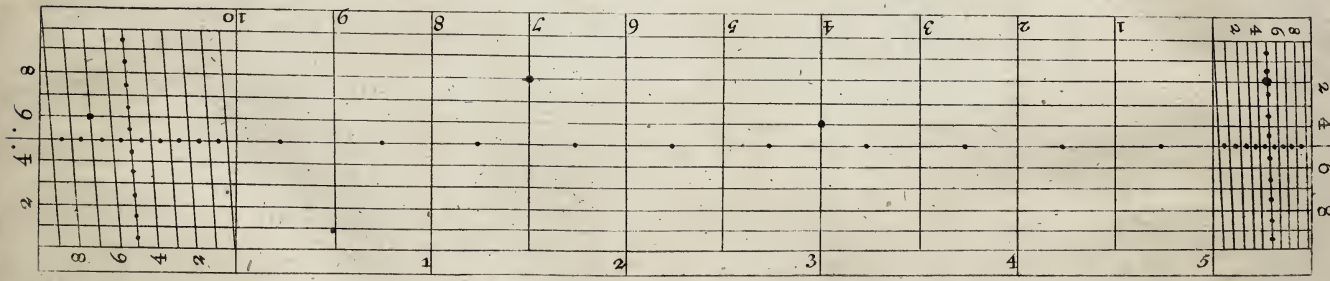
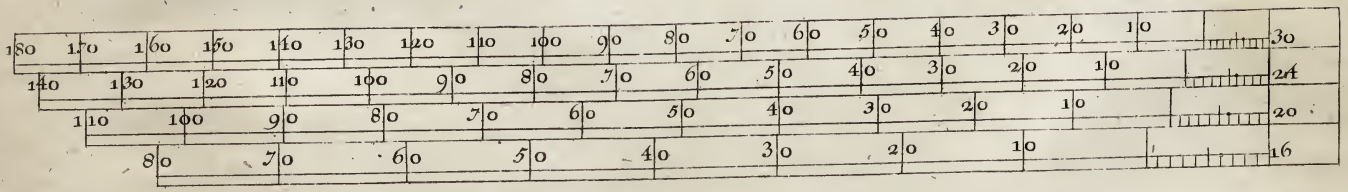


Fig. II.

A Scale of Equal Parts.



equal Part, divided by Diagonal Lines into ten Parts; each of which correſpond with the Diviſions of ten Links in the Chain. This Subdiviſion is number'd on the Sides, 2, 4, 6, 8, and in the ſame Manner on Top. If you imagine the Top Figures to denote Units, and thoſe on the Side Tens, 'tis then plain, that, if the Compaſſes be extended from the Point where the ſixth Line interſects that noted 3, to the Point where the Line denoting 70 is interſected by the ſaid 6th Line, that Diſtance ſhall be three Chains, 76 Links. This appears yet more plainly by the Dots made in each Point. Thoſe who would project a Field in a fourth Part of the Compaſs by which it might be laid down by the aforeſaid Scale, may lay the other Edge of it before them, where they may ſee the five former Diviſions divided into 10, and at the End one of them Decimally divided, as one of the other was. For Example, If you would take the Diſtance of 7 Chains, 52 Links, extend the Compaſſes from the Point where the 2d Line interſects the 7th, to the Point where the Line denoting 50 is interſected by the ſaid 7th Line. This appears plainer ſtill by the Dots.

FIG. 2.] There are alſo other Lines of equal Parts, which may be us'd in Surveying, as *Fig.* 2; One of them is divided into 180 Parts, and has before it a Part Decimally divided; and it is figur'd 30, intimating that 30 of thoſe Decimal Parts are equal to an Inch.

Hence

Hence the Line is call'd the *Line of* 30 *in an Inch.*

These Lines may be made Use of where you have a large Piece of Ground to protract, because each Division is equal to 10 Yards, Feet, or Chains, *&c.* Thus you see, that the Measure of 20 Chains, 60 Links, extends from the Dot on 20 to the 6th Division in the Part Decimally divided. But, as these Lines are more immediately useful in laying down and measuring Lines for Triangles, I pass them over, with this farther Remark, That against the other three Lines are figur'd 24, 20, 16, denoting that one of their Parts is decimally divided to 24, 20, 16 Parts in an Inch.

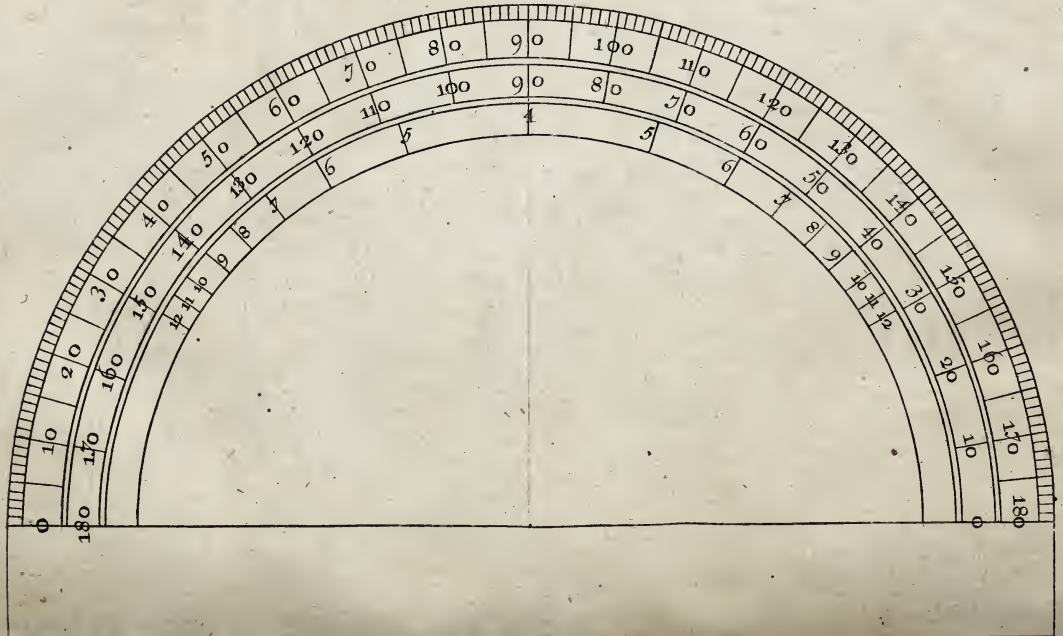
PROTRACTORS.

FIG. 3. THESE Instruments are of two Sorts: one represents a Semicircle, or half Theodolite; the other, a Parallelogram, or long Square.

The Protractor representing a Semicircle, is divided in the Limb, or Semicircle, into 180 equal Parts, or Degrees; those Degrees are number'd backwards and forwards, from 1 to 180, in two Semicircles; the Center of these Divisions is a little Notch, or Hole, made in the Line passing thro' the two Points of 180 Degrees; and therefore 'tis easy to imagine, that the two semicircular Divisions represent the

Fig. III.

The Semicircular Protractor.



the whole Theodolite; and the three Points of 90 and 180 Degrees, by moving the Inſtrument about its Center, may give the four Cardinal Points of Eaſt, South, Weſt, and North, *ad libitum.* Within the two Semicircles is a third, having ſeveral Diviſions number'd from the Point of 90, on both Sides 4, 5, 6, *&c.* to 12. Their Uſe is for the ready Diviſion of a Circle into 4, 5, or 6 Parts, *&c.*

Fig. 4. Let A D B be the Semicircle, A C B its Diameter, C the Central Point. On C B I would make an Angle of 60 Deg. 'tis eaſy to ſee that the Diameter of the Inſtrument muſt be plac'd on C B, and its Center at the Point of the Angle; if you count 60 Degrees from B, and prick 'em off in your Paper; and thro' C, and that ſmall Hole, draw C 60; 60 C B ſhall be an Angle of 60 Degrees, if you would have the ſame Angle to the left of your Inſtrument, it remaining in the ſame Poſture, prick off 60 Degrees from A, and draw C D.

But where the Theodolite gives the Angle in another Circle A E B, 'tis alſo eaſy to ſee that A C B repreſents the Diameter of the Inſtrument, and A E B the Semicircle; and, admitting the Index of the Theodolite cut 240 Degrees, reckon'd from A, that Quantity being 60 Degrees above a Semicircle A D B; prick off 60 Degrees, reckon'd from B or A, (according to the Circumſtance of your Work) and draw C F, or C G.

If

the whole Theodolite; and the three Points of 90 and 180 Degrees, by moving the Instrument about its Center, may give the four Cardinal Points of East, South, West, and North, *ad libitum.* Within the two Semicircles is a third, having several Divisions number'd from the Point of 90, on both Sides 4, 5, 6, *&c.* to 12. Their Use is for the ready Division of a Circle into 4, 5, or 6 Parts, *&c.*

FIG. 4. Let A D B be the Semicircle, A C B its Diameter, C the Central Point. On C B I would make an Angle of 60 Deg. 'tis easy to see that the Diameter of the Instrument must be plac'd on C B, and its Center at the Point of the Angle; if you count 60 Degrees from B, and prick 'em off in your Paper; and thro' C, and that small Hole, draw C 60; 60 C B shall be an Angle of 60 Degrees, if you would have the same Angle to the left of your Instrument, it remaining in the same Posture, prick off 60 Degrees from A, and draw C D.

But where the Theodolite gives the Angle in another Circle A E B, 'tis also easy to see that A C B represents the Diameter of the Instrument, and A E B the Semicircle; and, admitting the Index of the Theodolite cut 240 Degrees, reckon'd from A, that Quantity being 60 Degrees above a Semicircle A D B; prick off 60 Degrees, reckon'd from B or A, (according to the Circumstance of your Work) and draw C F, or C G.

If you would divide a Circle, ſuppoſe into ſix Parts, the Diameter of the Inſtrument being laid on any Line, A C B, and its Center on C, prick an Hole againſt the two Diviſions noted 6, on both Sides, and 'tis done.

The Plain Table.

THIS Inſtrument is uſually 15 Inches long, and 12 broad, and is made to fix on three Legs, by a Ball and Socket fitted to a Noſil in the Table. On the jointed Frame on both Sides of it are ſeveral Lines. On one Side the Line, next the Table, is an Inch-Diviſion; the next, a Tangent Line, conſiſting of 4 Ninety's, cent'ring in the Braſs Hole in the Middle of the Inſtrument; and the outermoſt Line is alſo a Tangent Line, divided into 360 Parts or Degrees, and each 10 Degrees to 30 Minutes; and has the ſame Center as the preceding Line. On the other Side of the jointed Frame, the Diviſion next the Inſtrument, is alſo an Inch-Diviſion, decimally divided; and the two next are Tangent Lines, conſiſting of 180 Degrees, and the outermoſt of them decimally divided, and each Degree into two thirty's of Minutes. Theſe Lines have for their Center a Braſs Hole, inclining to a Side of the Table; and therefore in the Uſe of them, the Frame muſt be ſo plac'd, that a Line paſſing from the Beginning to the End

End of them, ſhall alſo cut the ſaid Braſs Hole.

Box and Needle.

To one of the Sides of the Inſtrument is fix'd a Box, with a Chart containing a circular Diviſion of 360 Degrees, ſubdivided into the 32 Rhumbs, or Points of the Compaſs, and againſt each Point is its Name. The magnetic Needle plays on a Pin in the Center of the Chart. This Needle, when well touch'd by the Load-ſtone, always regarding the North and South Points; you are therefore to move your Inſtrument about, 'til you obſerve the Needle to hang over the North and South Line of the Chart, and then is your Table due Eaſt and Weſt, North and South.

The Inſtrument being thus truly plac'd, you are then enabled to take the Number of Degrees, which any Object makes with your Center in the Inſtrment, and to protract them at any Time, in Caſe the Weather be bad when you Survey.

The Index.

'Tis a Piece of Wood of two Foot long, and about one Inch $\frac{8}{10}$ broad, having a fiducial Edge, for better drawing Lines with Ink; to each End belongs a perpendicular Sight, for cutting Objects with, and finding Angles. On this Inſtrument are uſually laid down Lines of Chords to two Radii; and next thoſe, Lines

of equal Parts, ſuch as we have deſcrib'd; and next them a Surveying Scale, ſuch an one as is alſo deſcrib'd. The Edge of this Inſtrument is to go thro' the Centers before ſpoken of, or any aſſign'd Center on the Table.

The Uſe of the Plain Table.

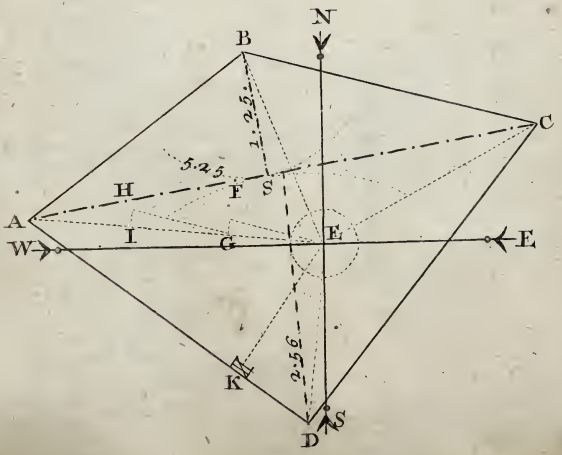
The Figure that is moſt uſually produced, on taking a Survey, is an irregular Polygon, having no Side parallel to its Oppoſite, nor any Side or Angle, correſponding with any other Side or Angle, and is call'd a Trapezium.

FIG. 5. Let the irregular Polygon or Trapezium A B C D, be a Field to be ſurvey'd.

Place your Table horizontally, (or parallel with the Earth) in any Part of the Feild, as at E; ſo that ſtanding there, you can ſee to each Angle A B C D; having a Sheet of clean Paper on your Table, and aſſuming any Point thereon, imagine it E, in E fix a Pin, and placing the Edge of the Index cloſe thereto, direct your Sights to Angle A, and then draw the occult Line E A; do ſo by the other Angles, and draw E B, E C, and E D. This being done, let two Perſons ſet out with the Chain from E towards A, the Foremoſt provided with ſix, or more, ſharpen'd Sticks or Irons of a Foot long each, and let them meaſure E A thus. Cauſe the foremoſt Perſon to go one Extent of the Chain; ſuppoſe

to

Fig. V.



to F, let him move about to the right or left, 'til you ſtanding at your Inſtrument, and looking thro' the Sights to A; obſerve the Man to come to Poinr 6, in the Line E A; E O being one Chain, let him place a Stick there, and proceed on towards A, imagine to H, where being ſtopp'd by the hinder Perſon's Arrival at G, let the hinder Perſon take up the Stick, and being brought as before to I, in Line E A; let him place a Stick, the hindermoſt Perſon takes up the Stick at G, and then ſuffers the foremoſt to proceed A; which is another Chain's Length, ſo that E G, G I, and I A, are juſt three Chains.

Set againſt A, Column-wiſe in this Manner three Chains.

Angles	*Meaſures.*	
	Ch.	*Lines.*
A	3	
B	2	14
C	2	51
D	1	90

Lines E B, E C, and E D, being meaſur'd in the ſame Manner, ſuppoſe E B 2 Ch. 14. Li. E C 2 Ch. 51. Li. and E D 1 Ch. 90 Li. Tabulate them as above.

Now repair to your Surveying Scale, and, as has been taught, take off 3 Chains, and ſet that Diſtance from E to A; ſet 2 Ch. 14 Li. from E to B, and draw A B; ſet 2 Ch. 51.

Li. from E to C, and 1 Ch. 90 Li. from E to D, and draw B C, C D, and D A. Laſtly, directing the Sights, the Edge of the Ruler on E, to the Middle of the Gate of the Field; draw E K, and on A D, draw the Gate at K: In the ſame Manner may any other obſervable in the Hedges be laid down.

To find the Content of this Trapezium.

From the two Angles moſt remote from each other, A C, draw the Baſe Line A C, take it in your Compaſſes, and ſetting it on your Scale, 'twill reach from the Point of 5 Chains to the Point of 25 Links amongſt the Diagonals. Set 5 Chains, 25 Links on A C, draw B S, and D S, perpendicular to A C; B S taken from the Scale is, 1 Ch. 25 Li. and D S is alſo 2 Ch. 56 Li.

To find the Content of this Field.

Multiply half the Baſe A C, by the Sum of the two Perpendiculars B S, and S D, without having any Regard to their being Decimals, and cutting off 5 Figures of the Product to the right (becauſe 1,00000 ſquare Links makes an Acre) the remaining Figures are Acres.

Multiply thoſe 5 Figures by 4, (4 Poles being an Acre) and cutting off 5 Figures, as before, the remaining Figures are Roods; multiply thoſe 5 Figures by 40, cutting off 5 Figures

gures as before, and the remaining Figures are Perches.

Operation.

Baſe A C — 5 25 *Perpendiculars* { 1 25 B S / 2 56 D S

$\frac{1}{2}$ — 2 62

3 81
2 62
762
2286
762

Acres . 99822
4

Roods 3)99288
40

Perches 39|71520

So that the ſuperficial Content of the Trapezium, is 0 Acres, 3 Roods, 39 Perches, $\frac{7}{10}$ of a Perch.

If you would know the North and South Lines of this Field, The Inſtrument remaining in Point E, place the Table, ſo that the Needle hang directly over the Points of North and South in the Box, then is the Table in the ſame Poſition; and if, thro' Point E, you by the Help of any Line, on the Frame draw a Line parallel to that Line, it ſhall alſo lie parallel with the Needle, and be the

true North and South Line; to this Line at right Angles, at Point E draw another Line, for the Line of East and West.

The THEODOLITE.

AS the Horizon (which is a great Circle of the Sphere) is, according to the best of Observations, divisible into 360 equal Parts call'd Degrees, each Degree containing 60 other Parts call'd Minutes: So the Theodolite is a round Instrument, representing the Horizon, and divided into 360 Degrees number'd at every tenth Degree, and each Degree subdivided into Halves and Quarters answering to 30 and 15 Minutes. It has two Diameters crossing each other at right Angles, whose Extremities represent the 4 Cardinals Points N. E. S. W. On the Center of these plays a moveable Diameter, whose Use is to give any intermediate Number of Degrees, with one of the fix'd Diameters, where the Quantity is less, or more than 90.

The Line, which represents North and South, passes thro' the Points of 180 and 360, and that Line (and, consequently, the Instrument) is rightly plac'd, when, by moving about the Instrument, the Needle in the Box plac'd in the Center, lies on the same Points.

To the fix'd Diameter, cutting into 180 and 360 Degrees, and to the moveable one (which for the Future we will call *The Index*) are

are fix'd perpendicular Sights for cutting Ob-Objects. The whole Inſtrument is ſuſtain'd, as a plain Table is, and its Uſe follows in the Survey of Field A B C D, preceding.

Place the Inſtrument at Point E, the Index lying on the Diameter, cutting 180 and 360 Degrees, and turn it about horizontally, 'til the Needle hang due North and South, and the two fix'd Diameters ſhall then anſwer the Lines N. S. and W. E.

Meaſure from Station E, to the four Angles, as has been taught, then direct the Sights of the Index to Point A, which will cut 6 Deg. 30 Min. (reckon'd from the Weſt Point of the central Line of the Diameter, repreſenting, E. and W.) Point B will cut 69 Deg. reckon'd from the aforeſaid Point; Point C will cut 151 Deg. 30 Min. reckon'd from the ſame Point; but Point D will cut 95 Deg. which, being in another Semicircle, you are therefore to reckon from the Point of Eaſt in the Inſtrument.

Theſe Sides and Angles being thus found, your Field-Book will ſtand as follows.

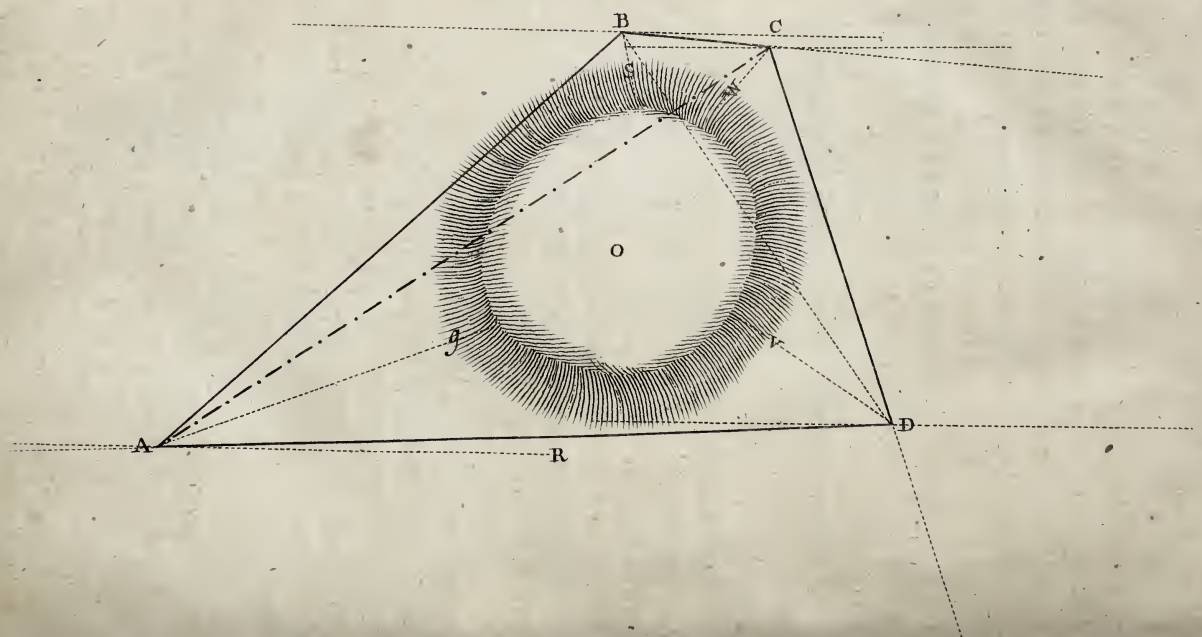
Angles	D.	M.	C.	L.
A	6	30	3	—
B	69	—	2	14
C	151	30	2	51
D	95	—	1	90

From whence plot your Field, in this Manner. In any Part of your Paper draw a Line N S, for your North and South Line, or Meridian Line; crofs it, at right Angles, in any Point, let it be at Point E, and draw the Line W E for your Eaft and Weft Line; fo fhall thofe two Lines repreſent the two fix'd Diameters of the Inſtrument. On W E lay the Diameter of the Protractor, with its Center on E, (the Point of meeting of the two Lines N S and W E) Angle A being 6 Degrees. 30 Minutes; make a Dot in the Paper, againſt that Quantity, and from Point E, thro' that Dot, draw an occult Line E A at Pleaſure, diſtance E A, being 3 Ch. ſet 3 Ch from E A; Angle B is 69 Deg. which prick off your Protractor, and draw the occult Line E B, which being 2 Ch. 14 Li. ſet that Quantity from E to B, and draw A B; Angle C being 151 Deg. 30 Min. prick it off, and draw E C, which being 2 Ch. 51 Li. ſet that Quant. from E to C, and draw B C; Ang. D is 95 Deg. which being in another Semicircle, place your Protractor on W. E. with the Semicircle downwards, and pricking off 95 Deg. draw the occult Line E D, which being 1 Ch. 90 Li. ſet it off from E to D, and draw A D.

This Survey imagines the Field to be a Level, but in Regard the Surveyor may be to ſeek when he meets with an hilly one, let A B C D be ſuch a Feild, and therein the Hill O. FIG. VI.

Place

Fig. VI.



Place the Inſtrument in any Angle thereof, A, and the Needle regarding North and South; let the Index cut a Mark at B, in 47 Deg. N. E. (reckon'd from the North Point in the Inſtrument.) Meaſure A B. 6 Ch. 35 Li. Meaſure alſo to the Foot of the Hill A g 3 Ch. 35 Li. cut a Man, or Mark, at g, in 70 Deg. N. E.

Your Inſtrument at B, the Index cuts C in 85 Deg. 30 Min. S. E. (from the South Point of the Inſtrument) meaſure B C 1 Ch. 50 Li. meaſure B s 65 Li. cut a Man at S, in 15 Deg. 30 Min. S E.

The Inſtrument at C, the Index cuts a Man at D, in 17 Deg. 30 Min. S. E. (from the South Point of the Inſtrument) meaſure C D 4 Ch. 10 Li. meaſure C w 85 Li. cut a Man at w, in 41 Deg. S. W.

Meaſure D A 7 Ch. 44 Li. meaſure D u 1 Ch. 72 Li. cut a Man at u, in 55 Degrees N. W.

From whence this is your Field-Book.

Angles.	D.M.		*Bearings.*	*Sides.*	C. L.		*Offsets to the Hill.*	C. L.		D.M.		*Bearings.*
A	47	—	N E	A B	6	35	A g	3	35	70	—	N E
B	85	30	S E	B C	1	50	B s	—	65	15	30	S E
C	17	30	S E	C D	4	10	C w	—	85	41	—	S W
D	—	—	—	D A	7	44	D u	1	72	55	—	N W

Pro-

Protraction of this Work.

Draw an Eaſt and Weſt Line, A R, at Pleaſure; place the Diameter of the Protractor therein, and its Center on any Point therein A: prick off 47 Deg. (reckon'd from the Point of 90 Degrees in the Inſtrument) N. E. and draw A B: ſet 6 Ch. 35 Li. from A to B.

Make an Eaſt, and Weſt Line to run thro' B, place the Diameter thereon, and its Center in B: prick off 85 Degrees 30 Minutes (reckon'd from the Point of 90 Degrees, S. E.) and draw B C; ſet 1 Ch. 50 Li. from B to C.

Make an Eaſt and Weſt Line to run thro' C, place the Diameter thereon, and its Center on C: prick off 17 Degrees 30 Minutes, (reckon'd from the Point of 90 Degres S. E.) and draw C D: ſet 4 Ch. 10 Li. from C to D.

Draw D A of Courſe, which will appear to be 7 Ch. 44 Li.

Thus have you the Shape of the Field, and, in Order to get that of the Hill, the Inſtrument being in Point A, the Bearing to g, the Foot of the Hill, was 70 Degrees N. E. which prick off, and draw A g; ſet 3 Ch. 35 Lines from A to g, the other Points, S w u, being found as eaſily by referring to the Field-book. I make the Foot of the Hill to run through g S w u, and ſhadow it, as in the Figure, to denote that it is an Hill.

To

To find the Contents of this Field, draw the Base-Line A C 7 Ch. 45, and Perpendiculars B w 95 Li. D w 3 Ch. 95 Li. and then the Work will stand as follows:

Base A C — 7 45 Perp. { 0 95 B w / 3 95 D w

½ 3 72

4 90
3 72

980
3430
1470

Acre 1)82280
4

Roods 3)29120
40

Perches 11)64800

The aforesaid Method of finding the Shape of a Field, by going about the same, being of great Use, I advise the Surveyor to note it well.

To

To plot a Field, whose Largeness and Irregularity will not permit its being taken at one Station.

By the PLAIN TABLE.

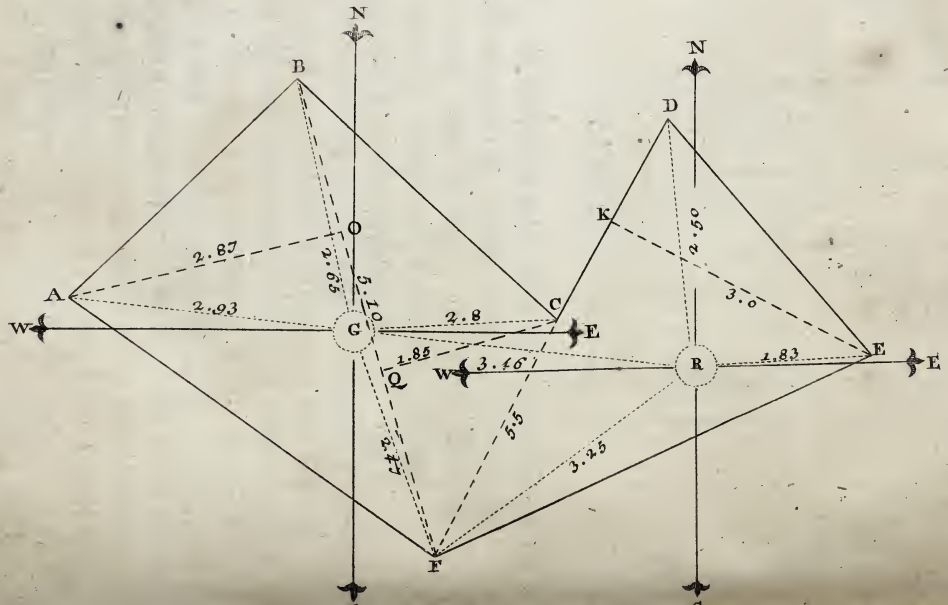
FIG. 7. LET the irregular Polygon A B C D E F be such a Field, and the first Station at Point G. Your Instrument being plac'd and prepar'd, as has been directed, direct your Index and Sights to A, and draw G A, measure G A 2 ch. 93 li. cut B, and draw G B, measure G B 2 ch. 65 li.; cut C, and draw G C, measure G C 2 ch. 8 li.; cut F, and draw G F, measure G F 2 ch. 47 li.; draw A B, B C, and F A.

At G direct your Sights and Index to any Point, or Person, standing in any Point, R, and draw G R, measure G R 3 ch. 46 li.

Point R is my second Station, where, placing my Instrument, I put the Index on the Line G R, and move it about, 'til I cut a Mark or Person standing at G, and there screwing it fast, 'tis prepar'd for taking the rest of the Field.

Direct your Index and Sights to D, and draw R D, measure R D 2 ch. 50 li.; cut Angle E, and draw R E, measure R E 1 ch. 83 li.; cut F, and draw R F, measure R F 3 ch. 25

Fig. VII.


N
B
O
2.87
2.85
5.10
A
2.93
W
G
2.8
C
E
1.85
3.46
Q
W
N
D
K
2.50
3.0
R
1.83
E
E
2.75
55
3.25
F

25 li. Now draw C D, D E, E F, and the Shape of the Field appears.

This Figure is divisible into the Trapezium A B C F, by the Line C F, and the Residue into the Triangle F D E, by the same Line.

Draw the Base-Line B F, which on your Scale is 5 ch. 10 li.: draw the Perpendicular C Q, which is 1 ch. 85 li.: draw the Perpendicular A O, which is 2 ch. 87 li.; set these several Distances on their proper Lines.

As for the Triangle F D E, its Base is always its longest Side F D, F D is on the Scales 5 ch. 5 li.; from E draw the Perpendicular E K, which is 3 ch.; set these Distances on their proper Lines. They who are curious to see the Entries of these Distances into the Field-Book, may take it as follows:

Angles.	*Measures.*	
	C.	L.
1st ⊙ at G		
A	2	93
B	2	65
C	2	8
F	2	47
2d ⊙ at R Stationary Distance. 3 ch. 46 li.		
D	2	50
E	1	83
F	3	25

To find the Content of this Field.

As in Trapezia we multiply half the Baſe by the Sum of the two Perpendiculars, ſo in Triangles, F D E, we multiply the Baſe F D by the Perpendicular E K, and take half the Product for its ſuperficial Content.

Here note, that, where a Field conſiſts of two or more Trapezia, and Triangles, you muſt make a ſeparate Work for each, and the Sum of thoſe Operations will be the Content of the Field.

See the Work of the Field before us:

Trapezium-Baſe B F 5 10 Perp. { 2 87 AO / 1 85 CQ

½ 2 55

4 72
2 55

2360
2360
944

Acre 1)20360
4

Roods 0)81440
40

Perches 32)57600

Triangle

Triangle — Baſe F D 5 5 Perp. E K 3 0
3 0

Acres 1650
4

Roods 6600
40

Perches 2)64000

		Acre.	*Roods.*	*Perc.*
Content of the	Trapezium—	1	0	32
	Triangle——	0	0	2
Content of the whole Field A B C D E F ———		1	0	34

By the THEODOLITE.

Place the Inſtrument at firſt Station G, the Index on the Diameter cutting 180 and 360 Degrees, and the Needle on the Line of North and South; meaſure from Station G to Angles A B C F, as has been taught; then direct the Index to A, and it will cut 6 Deg. (reckon'd from the Weſt Point of the Inſtrument) to B 77 Deg. to C 177 Deg. and to F 70 Deg. 30 Min. which being in another Semicircle, muſt be reckon'd from the Point of Eaſt in the Inſtrument. Thus much for the Trapezium, now for the Triangle.

The

The ſecond Station being R, I alſo direct the Index to R, which cuts 6 Degrees, which, being in the lower Semicircle, muſt be reckon'd from the Point of Eaſt. The Inſtrument being at R, move the whole Inſtrument, (not the Index) 'til the Needle hang over the North and South Line, as before; direct the Index to D, and it will cut 86 Deg. to E 179 Deg. and to F 145 Deg. (which being in another Semicircle, muſt be reckon'd from the Point of Eaſt in the Inſtrument.)

From whence your Entries in the Field-Book will ſtand as follows:

Angles.	*D.*	*M.*	*C.*	*L.*
1ſt ⊙ at G				
A	6	—	2	93
B	77	—	2	65
C	177	—	2	8
F	70	30	2	47
Stationary Declination —	6	—		
Stationary Diſtance---			3	46
D	86	—	2	50
E	179	—	1	83
F	145	—	3	25

From whence protract the Field in this Manner: In any Part of your Paper draw a Line N S, for your North and South Line, or

or Meridian Line of the Trapezium; croſs it at right Angles in any Point, let it be at Point G, and draw the Line W E for your Eaſt and Weſt Line: On W E lay the Diameter of the Protractor, with its Center on G, Angle A being 6 Degrees, B 77 Degrees, C 177 Degrees; prick them off, and draw G A, G B, G C; but Angle F being in another Semicircle, place the Semicircle downwards on W E, prick off 70 Degrees 30 Minutes, and draw G F; at the ſame Time draw the ſtationary Declination 6 Degrees, and draw G R. On G A ſet off 2 ch. 93 li.; on G B 5 ch. 10 li. and draw A B; on G C 2 ch. 8 li. and draw B C; and on G F 2 ch. 47 li. and draw F A.

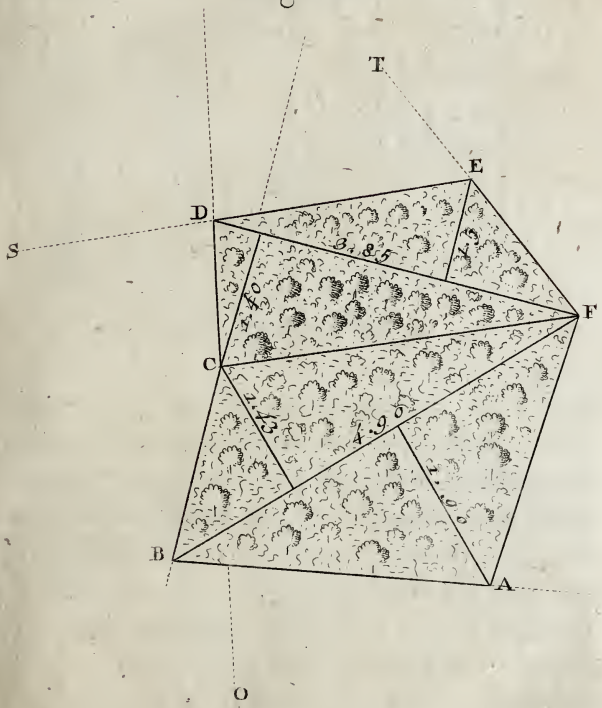
The ſtationary Diſtance being 3 ch. 46 li. ſet it from G to R, in which Point R drawing a new Meridian Line N S, croſs'd at right Angles in Point R, with the new Eaſt and Weſt Line W E; on W E place your Protractor with the Center of its Diameter on R, Angle D being 86 Degrees, E 179 Degrees; prick them off, and draw R D, R E; Angle F being in another Semicircle, place the Semicircle downwards, and then prick off Angle F 145 Degrees, and draw off R F: On R D ſet off 2 ch. 50 li.; on R E 1 ch. 83 li. and draw D E, and on R F 3 ch. 25 li. and draw E F, which compleats the Field.

To meaſure a Wood, which, by Reaſon of the Thickneſs of Trees, can only be meaſur'd on the Out-ſide.

FIG. 8. THE Truth of this Work depending wholly on the Exactneſs of Angles, I ſhall uſe the Theodolite only.

Let the irregular Polygon A B C D E F be ſuch a Wood; place the Inſtrument at A, and turn it about, 'til thro' the fix'd Sights you eſpy Angle B, and then ſcrew it faſt. Direct the Index to F, the Index will then cut 104 Degrees; remove to B, meaſuring A B 3 ch. 25 li. At B let the fix'd Sights cut Angle C, and the Index Angle A 80 Degrees, ſo ſhall Angle B be 80 Degrees. Remove to C, meaſuring B C 2 ch. 5li.; at C let the fix'd Sights cut Angle D, and the Index Angle B 200 Degrees, which exceeding a Semicircle, or 180 Degrees, is therefore an outward Angle, and muſt be noted thus >. Remove to D, meaſuring C D 1 ch. 44 li.; at D let the fix'd Sights cut Angle E, and the Index Angle C, 97 Degrees 30 Minutes, ſo ſhall Angle D be 97 Degrees 30 Minutes. Remove to E, meaſuring D E 2 ch. 65 li.; at E let the fix'd Sights cut Angle F, and the Index Angle D, 120 Degrees 30 Minutes, ſo ſhall Angle E be 120 Degrees 30 Minutes. Remove to F, meaſuring E F 1 ch. 75 li.; at F let the fix'd Sights cut Angle A, and the Index Angle E,

Fig. VIII.



124 Degrees, which is the Quantity of Angle F. Measure F A 3 ch.

From whence the Field-Book will stand thus:

Angles.	*D.*	*M.*	*Sides*	*C.*	*L.*
A	104	—	A B	3	25
B	80	—	B C	2	5
C	200	>	C D	1	44
D	97	30	D E	2	65
E	120	30	E F	1	75
F	124	—	F A	3	—

To protract this Work.

Draw a Line at Pleasure, as A B, on which apply the Diameter of your Protractor, with its Center on A, Angle A being 104 Degrees; (to be reckon'd from the left End of the Diameter, which, for the future, I shall call the North End, as the opposite End will be the South) prick off that Quantity, and draw A F, which, with A B, constitutes your Angle A; set 3 ch. 25 li. from A to B. Angle B being 80 Degrees, place the Center of the Diameter on B, and move the Instrument about, 'til A B cut 80 Degrees, to be reckon'd from the North End of the Diameter; prick off a Line by the Help of the Diameter, and draw B C. From B to C set 2 ch. 5 li. Angle C is

noted to be an outward one, or more than 180 Degrees, *viz.* 200 Degrees; therefore, in order to protract it, apply the Center of the Diameter on C, and againſt 20 Degrees, (the Exceſs above a Semicircle) to be reckon'd from the South End, make a Mark; then bring the Diameter of the Inſtrument to that Mark, (its Center ſtill on C) and at the North End prick a Mark, and draw C D; ſet 1 ch. 45 li. from C to D, ſo ſhall Angle C be 200 Degrees. Angle D is 97 Degrees 30 Minutes; place the Center of the Diameter on D, and move the Inſtrument about, 'til 97 Degrees 30 Minutes, reckon'd from the North End, cut C D, extended for this Purpoſe to O; at the ſaid North End of the Diameter make a Mark, and draw D E, ſo ſhall Angle D be 97 Degrees 30 Minutes. Set 2 ch. 65 li. from D to E, Angle E is 120 Degrees 30 Minutes, the Center of the Diameter on E; move it about 'til 120 Degrees 30 Minutes (reckon'd from the North End) cut D E, extended for this Purpoſe to S. The Diameter will then cut A F in F, ſo ſhall A F become 124 Degrees, and E F 1 ch. 75 li. F A will be alſo 3 ch.

The

The Wood, thus protracted, is divisible into two Trapeziums, A B C F, and C D E F, by means of the Line C F; and the Bases and Perpendiculars of each being drawn and measur'd, the Work will stand as follows.

Base B F	4 90	Perpend.	1 43
	½ 2 45		1 90
			3 33
			2 45
			1665
			1332
			666
		Acres .	)81585
			4
		Roods	3)26340
			40
		Perches	10)53600

Base DF 3 85

1 92

Perpend. { 1 40
1 5

2 90
1 92

580
2610
290

Acres .)55680
4

Roods 2)22720
40

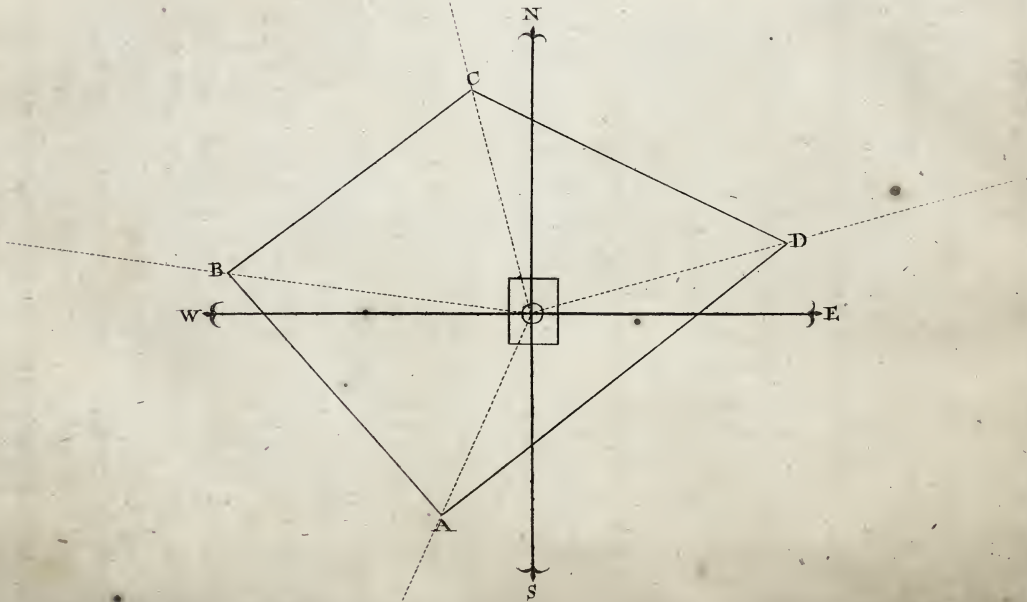
Perches 9)08800

	Acr.	*Roo.*	*Perc:*
1st Trapezium	0	3	10 $\frac{5}{10}$
2d Trapezium	0	2	9
Content of the Wood	1	1	19 $\frac{5}{10}$

To take the Plot of a Field by the plain Tabl
by means of the Angles only.

FIG. 9. LET the Field, to be survey'
be A B C D; place the joint
Frame, which is divided into 360 Degre
wi

Fig. IX.



with that Face upwards, with the Point of 360 Degrees next you; the Center of thoſe Diviſions will therefore be the Hole in the Middle of the Inſtrument: In any Part of the Field, as at O, place the Inſtrument, and move it about, 'til the Needle lie on the North and South Line of the Chart, and then ſcrew the Table faſt, fixing a Pin in the aforeſaid Hole; direct the Index and Sights thereby to A, and the Quantity cut on the Frame, will be 25 Degrees; to B 97 Degrees 30 Minutes, to C 165 Degrees 30 Minutes, and to D 254 Degrees 30 Minutes. Meaſure O A 2 ch. 25 li., O B 3 ch. 18 li., O C 2 ch. 40 li., and O D 2 ch. 70 li.; and then theſe will be your Field-Notes:

Angles.	*D.*	*M.*	*Lengths*	*C.*	*L*
A	25		⊙ A	2	25
B	97	30	⊙ B	3	18
C	165	30	⊙ C	2	40
D	254	30	⊙ D	2	70

From whence protract the Work thus: Draw the Lines W E and N S at right Angles; becauſe the Line N S repreſents the Line paſſing thro' the Points of 360 and 180 Degrees in the Table, the Diameter of the Inſtrument muſt therefore be plac'd on S N, and its Center in O; and then prick off the Angles, A 25 Degrees, B 97 Degrees, C 165

Degrees 30 Minutes: As for D, it being above a Semicircle, *viz.* 254 Degrees 30 Minutes, you must move the Semicircle round on O 'til the Diameter come again on N S: prick off 74 Degrees 30 Minutes, Supplement to 254 Degrees 30 Minutes, and draw ⊙ A, ⊙ B, ⊙ C, ⊙ D, on which Lines set off the Quantities noted in the Field-Book, and draw A B, B C, C D, and D A.

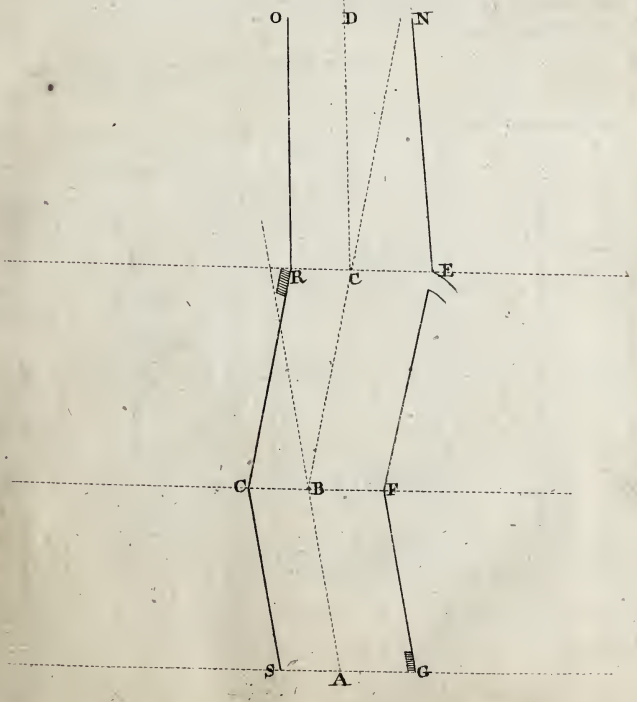
To survey a Road by the THEODOLITE.

FIG. 19. LET S C R O and N E F G be a Road to be survey'd: Begin at either End, suppose A, where place the Instrument, the Needle hanging over the Points of North and South in the Chart; let a Man go as far as you can see, or the next Bend of the Road, B, and direct your Index to cut him in 11 Degrees 30 Minutes, N W. Measure the Off-set to the Left, A S, 66 li., and the Off-set to the Right, A G, 75 li. Measure A B 1 ch. 90 li. an House to the Right at A.

Place the Instrument at B, in its former Position; let a Man go to C, another Bend; cut him with the Index in 10 Degrees, N E; measure B C (the stationary Distance) 2 ch. 32 li.; measure also the Off-set to the Left, B C, 58 li.; and to the Right, B F, 85 li.

Remove

Fig. X.



Remove to C, placing the Inſtrument as before: Let the Man remove to D, the End of the Road; cut him with the Index in 30 Degrees, N. W.; meaſure C D 2 ch. 55 li.; meaſure alſo the Off-ſet to the Left, C R, 58 li., and C E, Off-ſet to the Right, 85 li. at C, an Houſe to the Left, and to the Right a Lane tending thus, ⌇. At D meaſure the Off-ſets D ⊙ 60 li., and D N 65 li., and draw R O and E N. From whence may ariſe this Table:

Angles and Obſervations.	Stationary Diſtances. C.	L.
⊙ A Off-ſet { left 66 li. / right 75 li.		
An Houſe to the Right.		
⊙ B, N. W. 11 Deg. 30 Min.	1	90
Off-ſet { left 58 li. / right 85 li.		
⊙ C, N. E. 10 Degrees.	2	32
Off-ſet { left 58 li. / right 85 li.		
An Houſe to the Left, a Road to the Right ⌇		
To the End D, 2 Deg. N. W.	2	55
Off-ſet { left 60 li. / right 85 li.		

I reckon the Quantity of theſe Angles from the Point of North in the Inſtrument; they who pleaſe, may reckon their Complements to 90° from the Points of Eaſt or Weſt, and 'twill be the ſame Thing. If you would know the Length of this Road, add up the ſeveral ſtationary Diſtances, and their Sum is 5 ch. 77 li.; which, from the following Table, appears to be 126 Yards, $\frac{2}{10}$ of a Yard, which is ſomewhat more than half a quarter of a Mile, as is alſo evident from the Table.

A TABLE, reducing Chains and Links into Yards and Parts; and, contrary, from $\frac{2}{100}$ of a Yard to 2200 Yards, and from 1 Link to 100 Ch.

Yards.	*Parts*	*Ch.*	*Li.*
	.22		1
	.45		2
	.68		3
1	.37		6.2
2	.75		12.5
5	.5		25
11			50
22		1	
44		2	
66		3	
88		4	
110		5	
220		10	
440		20	
660		30	
880		40	
1100		50	
1320		60	
1540		70	
1760		80	
1980		90	
2200		100	

The Use of the foregoing TABLE.

What is the Length of 5 Chains 77 Links?

	Yards.
Against 5 Chains is	110
50 Links	11
25 Links	5 5
2 Links	0 45
Sum	126 95

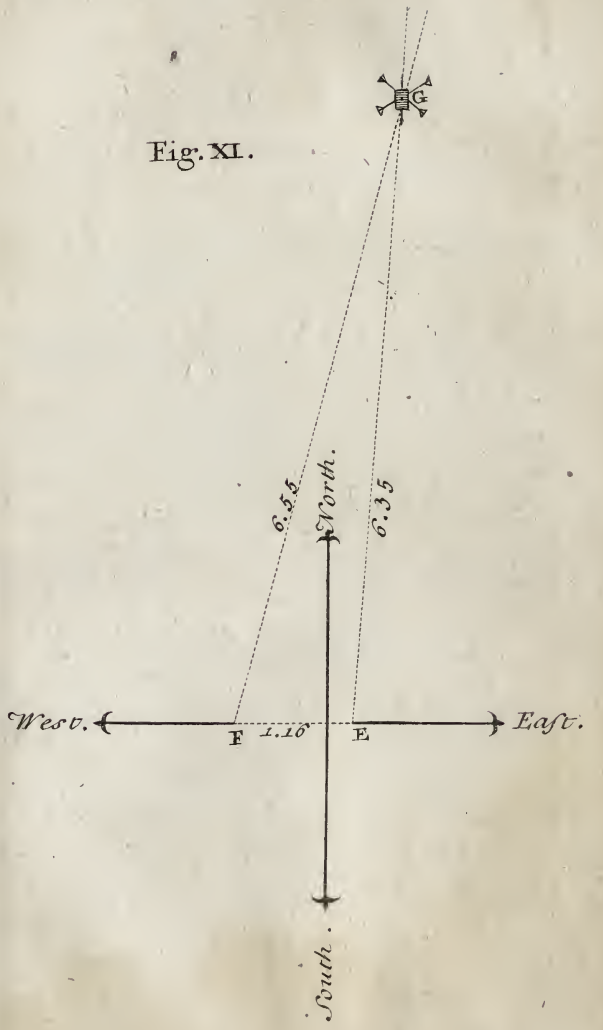
Contrary: In 126 Yards $\frac{95}{100}$, how many Chains and Links?

	Ch.	*Li.*
Against 110 Yards is	5	0
11 Yards	0	50
5 Yards	0	25
6 Parts	0	3
2 Parts	0	1
	5	79

To protract the aforesaid Road.

Thro' any Point, as A, draw an East and West Line, S A G, the Diameter lying with its Center on A and S A G, cutting 90 Degrees in the Limb or Semicircle; I say the Diameter shall then represent the North and South Line; and because Station B cuts 11 Degrees 30 Minutes North West, let the Semicircle lye to the West from the upper or North End of the Diameter, reckon 11 Deg. 30 Minutes, which prick off, and draw the occult

Fig. XI.



occult Line A B, of any Length, at Pleasure. Set 66 li. from A to S, and 75 li. from A to G; set also 1 ch. 90 li. from A to B; from B to Off-set C set 58 li., and to F 85 li.; draw S C and G F; at G draw an House.

Thro' B draw another East and West Line, C B F, whereon place the Instrument as before; but in regard the Angle at B, made by C, is 10 Degrees North East, let the Semicircle lie to the East, and from the North End of the Diameter reckon 10 Degrees, which prick off, and draw the occult Line B C: Set 2 ch. 32 li. from B to C; set 58 li. from C to R, and 85 li. from C to E, and draw C R and F E; at R draw an House, and at E draw a Lane, tending thus, §.

Thro' C draw an East and West Line, R C E, as before; and because Object D cuts 2 Degrees, *N. W.* place the Instrument as you did at A, and prick off 2 Degrees; draw C D, whereon set 2 ch. 55 li.; at D to O set 60 li. and to N 85 li., and draw R O and E N.

To take a Distance accessible or inaccessible.

FIG. 11. FROM E or F, I would know the Distance to the Wind-mill at G.

Being at Point E, set up a Mark at Point F, measure E F 1 Ch. 16 Li. your Theodolite at E; bring the Needle to the *North* and *South* Points of the Chart, and screw the Instrument fast; direct the moveable Index to cut the Wind-mill in 94 Deg. reckon'd from the Point of *West*. Remove

Remove any ſmall Diſtance as to Point F, where bringing the Needle to the *North* and *South* Points, as before, ſcrew the Inſtrument faſt, and direct the moveable Index to cut the ſame Wind-mill in 75 Deg. reckon'd from the Point of *Eaſt*. Set 1 Ch. 16 Li. from E to F, and then you may find the occult Triangle E F G, and alſo either Diſtance F G, or E G, thus:

Draw a Line at Pleaſure F E, for an *Eaſt* and *Weſt* Line, aſſume therein the Point E for your firſt Place of Obſervation; and ſetting 1 Ch. 16 Li. from E to F Points, F is your ſecond Place of Obſervation.

Place the Diameter of your Protractor on F E, with its Center on E; prick off 94 Deg. reckon'd from the *Weſt*, or left End of the Diameter, and draw a Line at Pleaſure E G.

The Diameter of the Inſtrument being ſtill on E F, but its Center on F, prick off 75 Deg. reckon'd from the *Eaſt*, or right End of the Diameter, and draw F G; the Interſection of the two Lines E G and F G, gives Point G, the Place of ſtanding of the Wind-mill.

The Diſtance of E G, taken from the Scale by which you ſet off E F, will appear to be 6 Ch. 35 Li. F G, taken from the ſame Scale, will be 6 Ch. 55 Li.

We by this Time ſuppoſe the Practitioner tolerably acquainted with the Methods of ſurveying, protracting, and adjuſting the Contents of any ſingle Field; and alſo of ſurveying,

veying, protracting, and finding the Length of a Road; therefore we will conclude this Part, by letting him into the Method of taking and protracting a whole Mannour.

Walk over the Mannour two or three times, the better to know where to begin, and how to proceed in your Works to the best Advantage; at which Time you may take such Notes and Memorandums, as you think proper, of all Roads, Lanes, Butting-hedges, Waters, Houses, *&c.* The Truth of this Survey depending on the exact taking of Angles, and it consisting of so many Parts as we imagine cannot be taken in the Fields, on one Piece of Paper, our Instrument shall be the *Theodolite*.

FIG. 12. Fixing the *Theodolite* at A, and the Needle hanging over the Meridian Line, let a Man stand at the first Bend of the Road B, direct your Index to him, and it will cut 9 Degrees N. E. which note down in your Field-Book, with this Mark ⊙ A 9 Degrees N. E.; measure the Off-sets to the right A G 32 li., left A O 35 li., and note them in your Book. Measure A B 4 ch. 5 li. The Instrument fix'd at B, as before it was at A, with the Index cut a Man at the next Bend C 15 Degrees, Off-sets to the left, B O, 35 li.; to the right, B Q, 35 li. a butting Hedge on

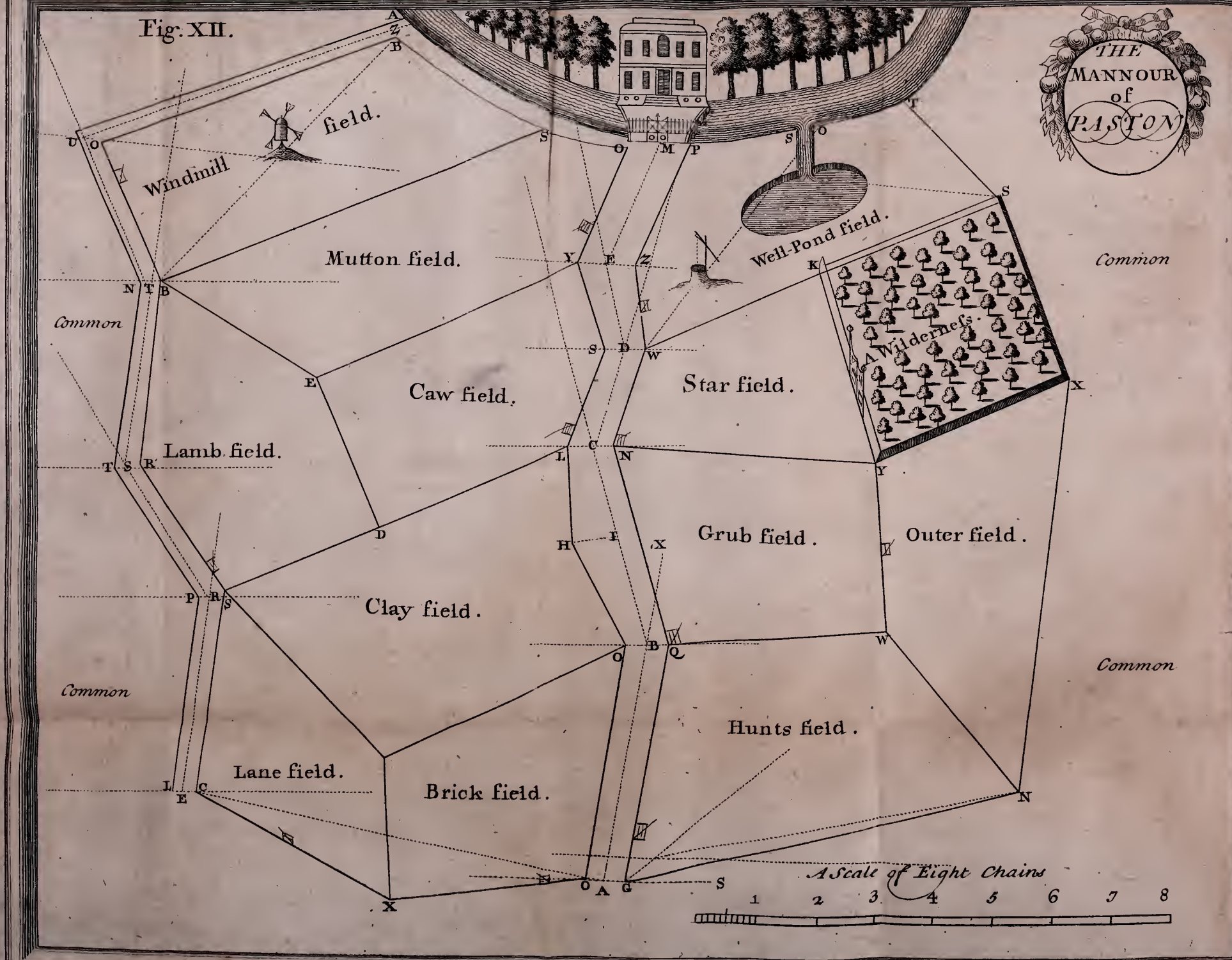
on each Side, B. Meaſure B C 3 ch. 45 li. at 1 ch. 89 li. from B, *viz.* at I, a Bend to the left, 84 li., to the right 46 li.; at C Off-ſets to the left 45 li., to the right 32 li., a But Hedge to the right and left.

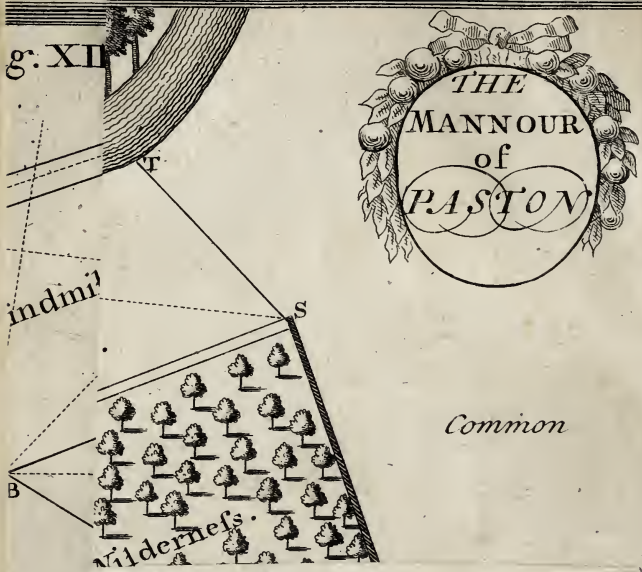
The Inſtrument fix'd at C, let the Index cut a Man at D, in 15 Degrees 30 Minutes N. E. Meaſure C D 1 ch. 72 li., at D Off-ſets to the left 35 li., to the right 35 li.; at D a But-Hedge to the right.

The Inſtrument fix'd at D, let the Index cut a Man at E, in 13 Degrees N. W. Meaſure D E 1 ch. 46 li.; at E Off-ſets to the right 45 li., to the left 47 li.; at E a But-Hedge to the left.

The Inſtrument fix'd at E, cut the Center of the Gate at M in 18 Degrees 30 Minutes N. E. Meaſure E M 2 ch. 18 li., Off-ſets to the right 50 li., to the left 4[illegible] li. By this Means one or more Sides of each Field, on each Side the Road, will, on Protraction, appear to be given; which ſhortening the Work, I ſhall not enter the Fields themſelves, 'til the Lane to the left of the Road be ſurvey'd. In order whereto, at A, your firſt Station, placing your Inſtrument as you did originally, let ſome high Object be plac'd at E, the Enterance of the Lane, which cutting with your Index in 78 Degrees N. W. meaſure A E (if you can) 7 ch. 34 li.; becauſe on Protraction, the Point E will be thereby found.

The


Fig. XII.
THE MANNOUR of PASTON
field.
Windmill
Mutton field.
Well-Pond field.
Common
Wilderness.
Common
Caw field.
Star field.
Lamb field.
Grub field.
Outer field.
Clay field.
Common
Hunts field.
Lane field.
Brick field.
A Scale of Eight Chains
1 2 3 4 5 6 7 8


g. XII
THE
MANNOUR
of
PASTON
r
indin
S
Common
B
Wilderness.

The Instrument fix'd at E, the Index cuts R in 7 Degrees N. E; Offsets to the right 23 li., to the left 14 li. E R is 3 ch. 35. li.; at R the Index cuts S in 31 Degrees 30 Minutes N. W; Off-sets to the left 15 li., to the right 20 li. At R a But-Hedge to the right, R S 2 ch. 60 li.

At S the Index cuts T in 7 Degrees N. E.; Off-sets to the right and left 20 li. each; S T 3 ch: 55 li..

At T the Index cuts O in 7 Deg. *N. W.* Off-sets to the right and left 20 li. each; T O 2 ch. 70 li.; at T two But-Hedges meeting in a Point to the right.

At O, where the Off-set left is 23 li., the Index cuts Z in 70 Degrees N. E; O Z is 5 ch. 63 li. At Z the Off-sets, right and left, are 12 li. each.

In surveying up O Z, I observ'd a Windmill in *Windmill field*, to find the Point whereon it stands, at Z I place my Instrument, with the Needle on the North and South Line, as before, and the Sights will cut it in 49 Degrees S. W. (reckon'd from the Point of West) At O the Index cuts the same Windmill, in 6 Degrees S. E. reckon'd from the Point of East.

By surveying this Lane, we have one or more Sides of each Field on one Side of it given.

We now enter the Fields themselves, beginning with

Hunt's Field.

In measuring the Road-Side G Q was given. To find a Station for your Instrument, work

thus: Meaſure 50 li. from G to W; let two Men ſtand, one at G, the other at W, each holding an End of the Chain; let the Surveyour take the Middle of the Chain, and ſtretch it out ſtrait to r (thus w r is 40 li., and G r 60 li.); at r place the Inſtrument, the Index on the Diameter; turn the whole Inſtrument about, 'til thro' the Sights you cut Angle G, (ſo is the Inſtrument fix'd), then direct the Index to Angle N, and the Degrees cut ſhall be 29, 30 (reckon'd from the North End of the Diameter); meaſure r N 6 ch. 20 li.; meaſure N G 6 ch. 75 li.; meaſure N W (a Side alſo of *Outer-field*) 3 ch 53 li.; meaſure W Q (alſo a Side of *Grub-field*) 3 ch. 65 li.; G Q the ſame as A B, which is already noted to be 4 ch. 5 li.

Outer-field. Side W N is given, meaſure N X 6 ch. 92 li., X Y 3 ch. 47 li., Y W 2 ch. 80 li.

Grub-field. Sides Q N, Q W, and W Y, given, meaſure N Y 4 ch. 40 li.

Star-field. Sides N W and N Y given, meaſure Y K 3 ch. 32 li. (of which from Y to the Center of the Wood-door, 1 ch. 66 li.) and W K 3 ch. 16 li.

Well-pond-field. Where, in meaſuring *Star-field*, we had Part of Side W S given, *viz.* W K 3 ch. 16 li.; meaſure the Remainder K S 3 ch. 24 li.; therefore W S is 6 ch. 40 li. K S bounds the Wood. Meaſure S T 2 ch. 30 li. T O bounds the River; at O come to a ſmall Cut into the Pond; meaſure T O 1 ch. 60 li.

S is the other Side of the Cut; measure S P 1 ch. 80 li.; at P come to the Gate and Road; therefore P Z and Z W (equal to E M and E D) are already given. On a Line W O ſtands a Well, 1 ch. 35 li. from W; from the Well to the Brink of the Pond 1 ch. 10 li.; from K (in Side W S) to the Pond 70 li.; from Angle S to the Pond 2 ch. 15 li.; Length of the Cut into the Pond, 65 li. Breadth 17 li.

The Wilderneſs. S K, K Y, and Y X, given, meaſure S X 3 ch. 20 li.

Fields on the left Side of the Road.

Had not Point E of the Lane been found, when we were at Point A of the Road, we muſt, on entering *Brick-field*, have proceeded to find a Station for the Inſtrument, as we did at r in *Hunt's-field.*

Brick field. Side O O given; meaſure O X 3 ch. 40 li.; meaſure X T 2 ch. 45 li.; meaſure T O 4 ch. 60 li.

Lane-field. Side T X given, meaſure X C 3 ch. 65 li. C S is given, (being equal to E R) meaſure S T.

Clay-field. Sides, S T, T O, O H, H L, given, meaſure L S, from L to D a But-Hedge, 3 ch. 50 li., and from D to S 2 ch. 82 li.; therefore L S 6 ch. 32 li.

Here we ſhall obſerve, that tho' the Sides, O H, H L, are more than B C, and therefore ſhould be meaſur'd, yet, being enabled by the Off-ſet I H to give the Point H, I can draw

L H and O H, and 'tis done; but they who please may, for more Certainty, measure those two Sides, and set them down amongst the rest.

Lamb-field. Sides, S D, S R, R B, given, measure B E 3 ch. 23 li., and E D 2 ch. 73 li.

Cow-field. Sides, Y S, S L, L D, and D E, given, measure E Y 4 ch. 85 li.

Mutton-field. Sides given, B E, E Y, Y O, measure O S 1 ch. 55 li. and S B 6 ch. 93 li. O S bends somewhat, and bounds the Lane or Passage; Breadth of the Lane, or Passage 25 li.

Windmill-field. Sides Z O, O B, and B S, measure Z S 2 ch. 92 li. In this Field a Windmill, of which more on Protraction. Z S a little bending. Breadth of the River 63 li.; over it a boarded Bridge to the Mansion-House; Breadth of the Mansion-House 1 ch. 40 li. Trees planted close to the River, and on each Side of the House.

From all which Work your Field-Book may stand as follows.

Station

STATIONS and REMARKS.	D.	M.	C.	L.
Road to the House.				
1st. ⊙ A, N. E.		9		
Off-set { to the right 32 li. to the left 35 li.				
A B			4	5
2d. ⊙ B, N. W.		15		
Off-set { to the left 35 li. to the right 35 li.				
At 1 ch. 89 li. from B. Off-set to the left 84 li. to the right 46 li.				
B C			3	45
3d. ⊙ C, N. E.		15 30		
Off-set { to the left 45 li. to the right 32 li.				
C D			1	72
4th. ⊙ D, N. W.		13		
Off-set { to the left 35 li. to the right 35 li.				
D E			1	46
5th. ⊙ E, N. E.		18 30		
Off-set { to the right 45 li. to the left 47 li.				
E M comes to the Gate of the House			2	18
Off set { to the right 50 li. to the left 45 li.				
A small winding Lane to the left at M.				

STATIONS and REMARKS.	D.	M.	C.	L.
Lane.				
At ⊙ A (of the Road) cut Entrance of the Lane, N. W.	7	8		
A E, Distance between the two Entries of the Road and Lane			7	34
1st ⊙ E, N. E.	7			
Off-set { to the right 23 li. to the left 14 li.				
E R			3	35
2d. ⊙ R, N. W.	31	30		
Off-set right and left 15 li. each				
R S			2	60
3d. ⊙ S, N. E.	7			
Off-set right and left 20 li. each.				
S T			3	1
4th. ⊙ T, N. W.	7			
Off-set right and left 20 li. each				
T O			2	70
5th. ⊙ O, N. E.	70			
Off-set { left 16 li. right 21 li.				
O Z			5	6
At Z Off-set right and left 12 li. Turn down to the Houſe by the River.				
At O a Windmill in *Windmill-field* bore S. E. 6 Degrees.				

A

STATIONS and REMARKS.	D.	M.	C.	L.
At Z the same Windmill bore S. W. 42 Degrees.				
Fields on the right Side of the Road.				
Hunt's Field.				
Belonging to the Station { G w — 50 li. on G Q; w r — 40; G r — 60				
⊙ at r	29	30		
r N			6	20
N G			6	75
N W, bounding *Outer-field*			3	53
W Q, bounding *Grub-field*			3	65
G Q, bounding the Road			4	5
Outer-field.				
W N, bounding *Hunt's Field*			3	53
N X, bounding a Common			6	92
X Y, bounding the *Wilderness*			3	47
Y W, bounding *Grub-field*			2	80
Grub-field.				
W Y, bounding *Outer-field*			2	80
Q W, bounding *Hunt's Field*			3	65

STATIONS and REMARKS.	D.	M.	C.	L.
Q N, bounding the Road to the Houſe			3	45
N Y, bounding *Star-field*			4	40
Star-field.				
N Y, bounding *Grub-field*			4	40
From Y to the Gate of the *Wilderneſs*, 1 ch. 66 li.				
Y K, bounding the *Wilderneſs*			3	32
W K, bounding *Well-pond-field*			3	16
W N, bounding the Road			1	72
Well-pond-field.				
W K, bounding *Star-field*, 3 ch. 16 li. K S, bounding the Wood 3 ch. 24 li. therefore W S			6	40
S T, bounding the Common			2	30
From T to O, the Cut of the River into the Pond			1	60
From S, the other Side of the ſaid Cut, to Angle P, to wit, S P (at P, the Gate of the Houſe.)			1	80
P Z, bounding the Road			2	18
Z W, alſo bounding the Road			1	46
Breadth of the Cut				17
Length of the Cut				65

From

STATIONS and REMARKS.	D.	M.	C.	L.
From W on a Line, to O the Cut, a Well at			1	35
From S to the Oval Pond			2	15
From W to the Pond			2	70
The Wilderneſs.				
Y Z, bounding *Outer-field*			3	47
K Y, bounding *Star-field*			3	32
1 ch. 66 li. from Y to the Gate.				
K S, bounding *Pond-field*			3	24
S X, bounding the Common			3	20
Fields on the left Side of the Road, between it and the Lane.				
Brick-field.				
O O, bounding the Road			4	5
O X, bounding the Common			3	40
X T, bounding *Lane-field*			2	45
T O, bounding *Clay-field*			4	60
Lane-field.				
X C, bounding the Common			3	65
C S, bounding the Lane			3	35

S T,

STATIONS and REMARKS.	D.	M.	C.	L.
S T, bounding *Clay-field*			3	93
X T, bounding *Brick-field*			2	45
Clay-field.				
T O, bounding *Brick-field*			4	60
S T, bounding the Lane			3	93
S L, bounding *Lamb* and *Cow-fields*, 6 ch. 32 li. (a But-Hedge at 3 ch. 50 li. from S to D.)			6	32
Angle at S runs up to the Lane.				
Lamb-field.				
S D, bounding Part of *Clay-field*			3	50
R S, bounding the Lane			2	60
R B, bounding the Lane			3	15
B E, bounding *Mutton-field*			3	23
A But-Hedge at Angle E				
E D, bounding *Cow-field*			2	73
Cow-field.				
E D, bounding *Lamb-field*			2	73
D L (Remainder of S L, 6 ch. 32 li.) *viz.* S D is 3 ch. 50 li. therefore D L is			2	82
L S, bounding the Road			1	72

STATIONS and REMARKS.	D.	M.	D.	L.
S Y ditto	—	—	1	46
Y E, bounding *Mutton-field*	—	—	4	85
Mutton-field.				
B E, bounding *Lamb-field*, and running up to the Lane	—	—	3	23
E Y, bounding *Cow-field*	—	—	4	85
Y O, bounding the Road	—	—	2	18
O S, a ſmall Bend, bounding the Paſſage coming in at the upper End of the Road	—	—	1	55
Breadth of the ſaid Paſſage	—	—		25
B S, bounding *Windmill-field*	—	—	6	93
Windmill-field.				
S B, bounding *Mutton-field* — It runs up to the lane.	—	—	6	93
B O, bounding the Lane	—	—	2	70
O Z, bounding the Lane, and running up the Path by the River	—	—	5	63
O Z bends ſomewhat				
Z S, Part of the Path running by the River	—	—	2	92
A Windmill in the Field, whoſe Bearing was taken in meaſuring the Lane O Z, which *vide.*				

Along

STATIONS and REMARKS.	D.	M.	C.	L.
Along the Path to the House, Z S and S O, a River 63 li. broad: Over it a boarded Bridge, adjoining to the Mansion-House. Trees planted close to the other Side of the River, on each Side the House.				
Breadth of the House	—	—	1	40

The practical Surveyor will, perhaps, think these Notes much too bulky; but a Beginner may want them, and he is at Liberty to shorten them, as he increases his Knowledge.

To protract the Work of this Mannour.

In this, as in the former Work, I make the Point of 90 Degrees to pass thro' the East and West Line in my Paper; and therefore the Diameter becomes the North and South Line, from which Diameter I reckon the Degrees and Minutes of any Angle.

Your Field-Book being before you, on a Sheet of Paper draw a right Line, in any convenient Place thereof, as O A S; for an East and West Line, assume Point A therein for your first Station; whereon placing the Protractor, as aforesaid, prick off 9 Degrees, *N. E.* and draw A B, of any Length; set 4 ch. 5 li. from A to B.

Thro'

Thro' B, the second Station, draw an East and West Line; whereon placing the Instrument, prick off 15 Degrees, *N. W.* and draw B C; set 3 ch. 45 li. from B to C.

Thro' C, the third Station, draw an East and West Line; whereon placing the Instrument, prick off 15 Degrees 30 Minutes, *N. E.* and draw C D; set 1 ch. 72 li. from C to D.

Thro' D, the fourth Station, draw an East and West Line; place the Instrument, and prick off 13 Degrees, *N. W.* and draw D E; set 1 ch. 46 li. from D to E.

Thro' E, the fifth Station, draw an East and West Line; place the Instrument, and prick off 18 Degrees 30 Minutes, *N. E.* and draw E M; set 2 ch. 18 li. from E to M, where I am come to the Gate.

Off-sets in this Road.

First Station, A, Off-set to the right 32 li. to the left 35 li., which set from A, on each Side, accordingly.

Second Station, B, Off-set to the left 35 li., to the right 35 li.; draw O O and G Q.

Between the second and third Stations, at 1 ch. 89 li. from B Off-set to the left 84 li., to the right 46 li.; draw O H and Q X.

Third Station, C, Off-set to the left 45 li., to the right 32 li.; draw H L and X N.

Fourth Station, D, Off-set to the left 35 li., to the right 35 li.; draw L S and N W.

Fifth

Fifth Station, E, Off-ſet to the right 45 li., to the left 47 li.; draw S Y and W Z.

At M, the Gate, Off-ſet to the right 50 li., to the left 45 li.; draw Y O and Z P.

We would now have begun with the Fields, but as the Lane ſtands next in Order in the Field-Notes, we will firſt diſpatch that.

At Point A with the Index cut Point E, in the Road, 78 Degrees; fix the Center of the Protractor on A, and its Diameter to repreſent North and South; and then prick off 78 Degrees, and draw A E; ſet 7 ch. 34 li. from A to E.

Point E being found, it is my firſt Station.

Thro' E draw an Eaſt and Weſt Line; whereon placing the Protractor, prick off 7 Degrees, *N. E.* and draw E R; ſet 3 ch. 35 li. from E to R.

Thro' R draw an Eaſt and Weſt Line; place the Protractor, and prick off 31 Degrees 30 Minutes, *N. W.* and draw R S; ſet 2 ch. 60 li. from R to S.

Thro' S draw an Eaſt and Weſt Line; place the Protractor, and prick off 7 Degrees, *N. E.* and draw S T; ſet 3 ch. 15 li. from S to T.

Thro' T draw an Eaſt and Weſt Line; place the Protractor, and prick off 7 Degrees, *N. W.* and draw T O; ſet 2 ch. 70 li. from T to O.

Thro' O draw an Eaſt and Weſt Line; place the Protractor, and prick off 70 Degrees,

grees, *N. E.*; draw O Z, and set 5 ch. 63 li. from O to Z.

Off-sets in the Lane.

First Station, E, Off-set to the right 23 li., which set from E to C; to the left 14 li., which set from E to L.

Second Station, R, Off-sets to the right and left 15 li. each; draw L P and C S. Two But-Hedges to the right.

Third Station, S, Off-sets to the right and left 20 li. each; draw P T and S R.

Fourth Station, T, Off-sets to the right and left 20 li. each; draw T N and R B. Two But-Hedges to the right.

Fifth Station, O, Off-set to the left 16 li., to the right 21 li.; draw N U and B O.

At Z Off-sets to the right and left 12 li.; draw U A and O B.

In measuring O Z, I observ'd a Windmill in *Windmill-field*, which, now I am about that Part, I will place down, tho' the Field be not fully drawn.

At O I observ'd, by my Theodolite, that it bore *S. E.* 6 Degrees; wherefore place the Protractor at O, as you did before, and set off 96 Degrees, which is 6 Degrees, *S. E.* from the Point of East, and draw O X.

At Z I make the same Observation, and finding the Windmill bears 42 Degrees, *S. W.* place the Protractor, and prick off 42 Degrees, and draw Z X. The Intersection of these two Lines

Lines gives the Point of the Windmill, X; draw the Windmill according to its Shape.

Fields to the right of the Road.

Hunt's-field. Herein your Station was found at r, thus: G Q is already drawn; ſet 50 li. from G to W; on W ſtrike an Arch, with the Diſtance of 40 li., and on G interſect it with 60 li.: Then draw G r, which becoming the Line whereon you lay the Diameter of the Protractor, with its Center on r, and pricking off 29 Degrees 30 Minutes; (the Quantity of Angle N, taken at r) draw the occult Line r N; ſet 6 ch. 20 li. from r to N; and then draw G N, which is 6 ch. 75 li. *N. W.* being 3 ch. 53 li.: Take 3 ch. 53 li. from your Scale in your Compaſſes, and on N ſtrike an Arch towards W, Q W being 3 ch. 65 li.; take that Diſtance from your Scale, and on Q interſect your former Arch, which will give Point W; draw N W and W Q. In the Field-Book I have ſet down, a ſecond time, all the Sides of each Field, which were before given, on protracting any other Field, for the Surveyor's more ſure Guide in the Proſecution of his Work; but he may omit it if he pleaſes.

Outer-field. This Field cannot be protracted, (as it will appear on Tryal) 'til we have diſpatch'd *Grub field*; therefore go to

Grub-field. Sides Q N, and Q W, are protracted. On N ſweep 4 ch. 40 li. towards Y; on

on W ſweep 2 ch. 80 li. towards Y; to the Interſection at Y draw N Y and W Y.

Outer field. Sides Y W and W N given. On N ſweep 6 ch. 92 li. towards X; on Y ſweep 3 ch. 47 li. towatds X; to the Interſection at X draw Y X and N X.

Star-field. Sides N Y and N W are protracted. On W ſweep 3 ch. 16 li.; towards K and on Y ſweep 3 ch. 32 li. towards K: To the Interſection at K draw W K and Y K. Y K bounding the *Wilderneſs*, take 1 ch. 66 li., and ſet it from Y to the Point of the Gate of the ſaid *Wilderneſs*.

The Wilderneſs. Sides W X and K Y are protracted. On K, towards S, ſtrike an Arch with 3 ch. 24 li., towards S; and on X ſtrike an Arch with 3 ch. 20 li. towards S; to the Interſection at S draw K S and X S.

Well pond-field. Sides S W, W Z, and Z P, are protracted. On S, towards T, ſtrike an Arch, with the Diſtance of 2 ch. 30 li.; P S is 1 ch. 80 li.; Breadth of the Cut 17 li., and T O 1 ch. 60 li.; therefore P T is 3 ch. 57 li. On P, towards T, ſtrike an Arch with 3 ch. 57 li., and draw S T; ſet 1 ch. 60 li. from T to O, and 17 li. from O to S, and 65 li. for its Length, and draw the Cut. Meaſure 2 ch. 15 li. from Angle S, (next the *Wilderneſs*) and 2 ch. 70 li. from Angle W, in a Line, towards O, which will give you the two Ends of the Pond. From W to the Well 1 ch. 35 li.

Fields to the left of the Road, between it and and the Lane.

Brick-field. Sides O O. On O, towards X, ſweep 3 ch. 40 li. On C (in *Lane-field*) ſweep 3 ch. 65 li. towards X; to the Interſection draw O X in *Brick-field*, and C X in *Lane-field*. On O, towards T, ſweep 4 ch. 60 li., and on X, towards T, 2 ch. 45 li.; to the Interſection at T draw O T and X T.

Lane field. Sides T X, X C, and C S, are given. On S, towards T, ſtrike 3 ch. 93 li. or (which is the ſame Thing) draw S T.

Clay-field. Sides S T, T O, O H, H L, given. Draw S D L. A But-Hedge to D, at 3 ch. 50 li. from S.

Lamb-field. Sides S D, S R, R B, given. On B ſweep 3 ch. 23 li. towards E; on D ſweep 2 ch. 73 li. towards E; to the Interſection at E draw B E and D E.

Caw-field. Sides E D, D L, L S, and S Y, given. Draw E Y, which will be found to be 4 ch. 85 li.

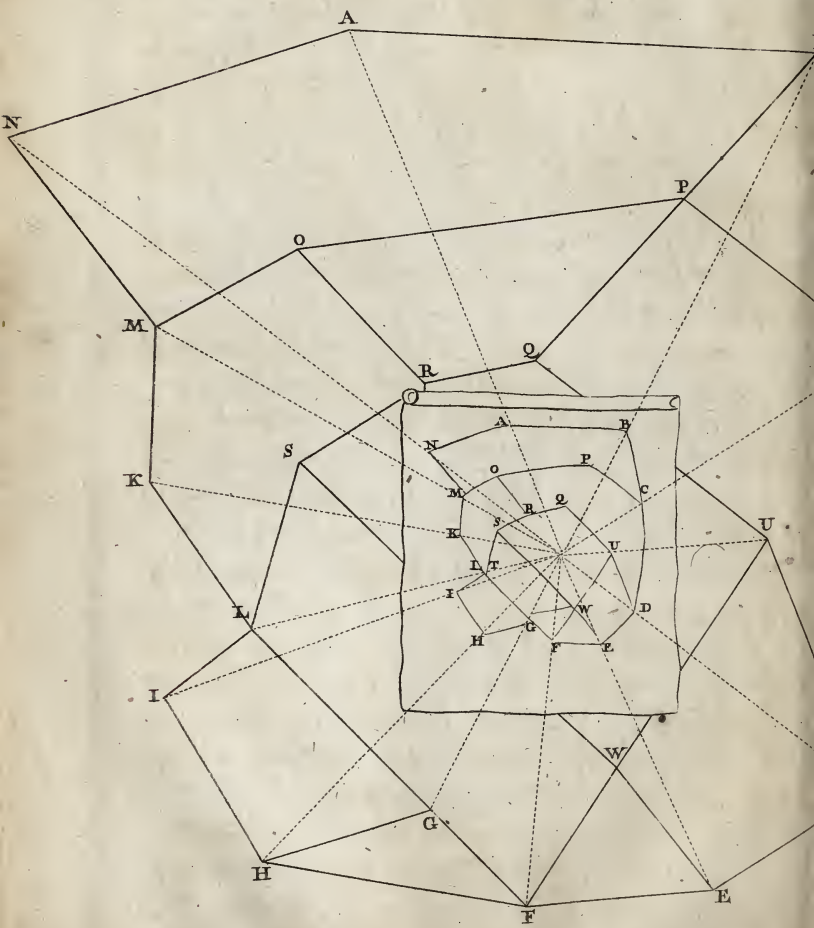
Mutton-field. Sides B E, E Y, and Y O, given. O S is a ſmall Bend; on O ſweep 1 ch. 55 li. towards S, and on B ſweep 6 ch. 93 li. towards S; to the Interſection at S draw O S ſomewhat bending, and B S.

Windmill-field. The Point of the Windmill has been already given, and ſo have Sides Z O, O B, and B S. On B ſweep 6 ch. 93 li. towards S; or (which is the ſame Thing) draw

B S

Fig. 13.

Of the Contraction or Enlargment of Ma



B S 6 ch. 93 li. a little bending, to anſwer S O.

The Field Book implies the Grounds, which fetch in this Mannour, to be a Common; wherefore the Word *Common* may be written in convenient Places accordingly.

He who would give the Contents of this Mannour in Acres, may reduce the ſeveral Fields, the Road, and Lane, into Trapezia and Triangles, and work according to the Method I have before plainly laid down; and the Anſwers of all the Operations, added together, ſhall be his grand Anſwer.

You may, if you pleaſe, inſert, as I have done, the Scale by which you meaſur'd, together with the Name of the Mannour, in a fair Compartment: It may alſo, for more Beauty, be adorn'd with tranſparent Water-Colours, painting all Trees and Hedges of a pretty deep green, Fields of a pale green, Waters blue, Roads, *&c.* yellow; inſert alſo each Field's Name.

A Mannour, ſo drawn, may be drawn in a bigger or leſs Compaſs, by ſquaring your Draught, and making your new Paper of the ſame Number of Squares, and then by putting all into one Square, which you ſee in the Square correſponding with it; your new Draft ſhall be exact in all Particulars.

This has been the uſual Method of contracting or enlarging any Map or Plott of a Field, or Eſtate; but the quickeſt, and, I think, the eaſieſt Method, is as follows; which, for

more Certainty and Clearness, I have illustrated by a Scheme in the next Plate, *Fig.* 13.

If you would enlarge your Map, place your little Draught on the Middle of your Paper, whereon you design to draw it larger; and, fixing upon one common Center, (no great Matter where, but somewhere in the Middle) and extend the Angles, or radiant Lines, with your black Lead Pencil, every where throughout your Plott; as you see the Lines A B C, *&c.* are in the 13th Figure of the the next Plate.

There are Compasses to be bought, that are larger at one End than the other, and by that Means more expeditiously perform this Work; but if such are wanting, it is done by altering the Compasses from one Scale to another.

This, then, is the Method you are to take, after you have extended the *Radius*-Lines: Or you may do it by the Side of the Rule only, without drawing these Lines; and, as in the Example, the Lines A B be 100 Foot, Perches, or Chains, or any other Number, drawn on a Scale of 200 or 100 to an Inch; and you are to enlarge it to 50, which is an usual Scale in Gardening, tho' Learners oft use 24 or 30 Parts in an Inch.

It is very obvious, how the same is to be set off upon that, and all the other Radiant Lines; and by marking the Angles with 1, 2, 3, 4, *&c.* in Pencil, that it may be afterward rubb'd out, you, when all the Points are laid down, draw the Line. But the whole

Pro-

Proceeding is so plain on the Paper, that I need not enlarge on it in Words.

And the same Method that is taken in the enlarging a Map, is taken in the contracting thereof.

In order to have the more Room to begin one's Work, clear off all Lines wrought, to fix the Center in the largest Field in the whole Plan, be it either on one Side or the other, so will the Lines, in more Probability, be clear of the little Draught; but if they are not clear of it, 'tis easy, by Inspection from given Lines, to lay down the Angles and Intersections, and from thence the Lines that are hid under that Paper.

See the Method in Figure 13 of the next Plate.

I might, in this Chapter of Instruments, have given the Cutts of the several Instruments to be us'd in Surveying and Gardening; but they are now so very well known, that I think it needless; and all that I shall add to this Chapter, is concerning the Square Level and Boning-Staves, Arrows, *&c.* made Use of in Gardening. It would be ridiculous for me to give an Account of the Make, Fashion, and Use of a Rake, or Spade, *&c.* but these are not so well known; and I take Mr. *James*'s Translation to be deficient in that Kind.

The Description and Use of the Measuring-Rods, Square-Level, Boning-Staves, &c. made Use of in setting out Gardens.

THE 1st is a Measuring-Rod of 10 Foot long, divided into Feet, Halves, and Quarters; and a Foot at one End into the 12 Inches: This is very light and commodious for measuring short Lengths (as the Chain is in measuring great Distances) and even a Gentleman himself ought to have one of five Foot long, to carry in his Hand amongst his Work-men, to be ever and anon measuring and proving their Work by it. They are both commonly made of Deal, the first an Inch and an half or two Inches square; the latter an Inch square, both tapering from the Middle to the Top.

The next is a Level of 10 Foot long, and a Piece of Deal, fram'd exacty into the Middle; and at right Angles with the Bottom, a Raze made therein, and a Hole made at the Bottom for a Lead-Plumb (fasten'd from a Line at the Top) to play in that Hole, by which we know when 'tis level. But this ought to be often prov'd, because it will cast lying and being us'd Abroad; and when you are using it, to see that you don't mistake, you are to try it, End for End, on the Heads of your Stakes. But this Instrument is so common

mon amongſt all Sorts of Workmen, that I need ſay no more of it.

The next are what we call Boning or Levelling Staves. They are all four Foot and an half long; and there are three of them, one to be carry'd by the Gardener, the other by a ſtrong Labourer that can drive Stakes in, and the third by a Boy, on the Top of whoſe Staff there ought to be ty'd a Piece of white Paper, and a ſquare black Board on the Top, nail'd ſloping on the Back-ſide of it, to retain the Strength of the white Paper the better.

The Uſe of all theſe will better appear hereafter, when we come to ſpeak of ſetting out Gardens.

Of dividing Lands.

§. 2. THE dividing of Lands well, and with Diſpatch, is ſo eſſential to our preſent Purpoſe, that I could not but beſtow this Section on that Subject, taken from a very ingenious Author, whoſe Name I have mention'd in the *Preface*.

How to divide a Triangle ſeveral Ways.

Suppoſe A B C (Fig. 1. of the next Plate) to be a triangular Piece of Land containing

60 Acres, to be divided between two Men; the one to have 40 Acres cut off towards A, and the other 20 Acres towards C, and the Line of Division to proceed from the Angle B. First measure the Base A C, *viz.* 50 Chains no Links; then say, by the *Rule of Three*, If the whole Content, 60 Acres, give 50 Chains for its Base, what shall 40 Acres give? Multiply and divide, the Quotient will be 33 ch. 33 li.; which set off upon the Base, from A to D, and draw the Line B D, which shall divide the Triangle, as was requir'd. If it had been requir'd to have divided the same into 3, 4, 5, or more unequal Parts, you must, in like Manner as Merchants part their Gain, by the *Rule of Fellowship.*

There are several Ways of doing this by Geometry, without the Help of Arithmetick; but my Business is not to shew you what may be done, but to shew how to do it the most easy and practicable Way.

How to divide a triangular Piece of Land into any Number of equal and unequal Parts, by Lines proceeding from any Point assign'd in any Side thereof.

Let A B C (Fig. 2. of the next Plate) be the triangular Piece of Land, containing 60 Acres, to be divided between three Men; the first to have 15 Acres, the second 20, and the third 25 Acres, and the Lines of Division to pro-

Fig. 1.

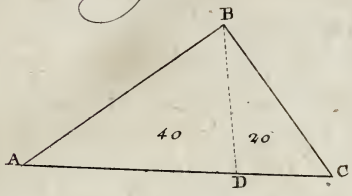


Fig. 2.

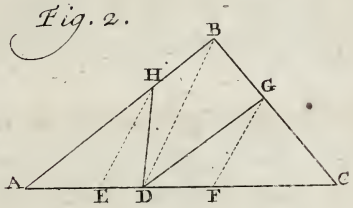
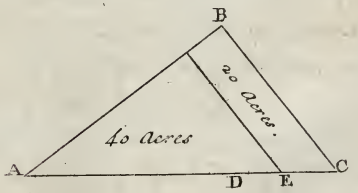


Fig. 3.



proceed from D. Firſt meaſure the Baſe into three Parts, as you have been before taught, by ſaying, If 60 give 50, what ſhall 15 give? Anſwer, 12 Chains 50 Links for the firſt Man's Baſe; which ſet off from A to E. Again, ſay, If 60 give 50, what ſhall 20 give? Anſwer, 16 Chains 66 Links for the ſecond Man's Baſe, which ſet off from E to F; then, conſequently, the third Man's Baſe, *viz.* from F to C, muſt be 20 Chains 84 Links. This done, draw an obſcure Line from the Point aſſign'd D to the oppoſite Angle B; and from E and F draw the Lines E H and F G parallel to B D. Laſtly, from D draw the Lines D H, D G, which ſhall divide the Triangle into three ſuch Parts as was requir'd.

How to divide a triangular Piece of Land according to any Proportion given, by a Line parallel to one of the Sides.

A B C is the triangular Piece of Land, (*vide* Fig. 3. of the next Plate) containing 60 Acres, the Baſe is 50 Chains; this Piece of Land is to be divided between two Men, by a Line parallel to B C, in ſuch Proportion, that one have 40 Acres, the other 20.

Firſt, divide the Baſe, as has been before taught, and the Point of Diviſion will fall in D, A D being 33 Chains 33 Links, and D C 16 Chains 67 Links. Secondly, find a mean Proportion between A D and A C, by multiplying the whole Baſe 50 by A D 33, 33 the Product

Product is 16665000; of which Sum extract the Root, which is 40 Chains 82 Links, which set off from A to E. Lastly, From E draw a Line parallel to B C, as in the Lines E F, which divides the Triangle, as demanded.

Of dividing four-sided Figures, or Trapezia.

Before I begin to teach you how to divide Pieces of Land of four Sides, it is convenient first to shew you how to change any four-sided Figure into a Triangle; which done, the Work will be the same as in dividing Triangles.

How to reduce a Trapezium into a Triangle, by Lines drawn from any Angle thereof.

Let A B C D (Fig. 4 of the next Plate) be the Trapezium to be reduc'd into a Triangle, and B the Angle assign'd; draw the dark Line B D, and from C make a Line parallel thereto, as C E; extend also the Base A D, 'til it meet C E in E; then draw the Line B E, which shall make the Triangle A B E equal to the Trapezium A B C D.

Now, to divide this Trapezium according to any assign'd Proportion, is no more but to divide the Triangle A B E, as before tanght; which will also divide the Trapezium.

Example.

Fig. 7.

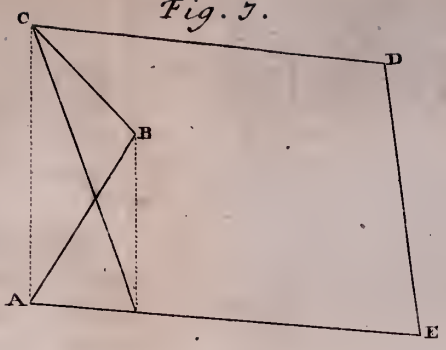


Fig. 6.

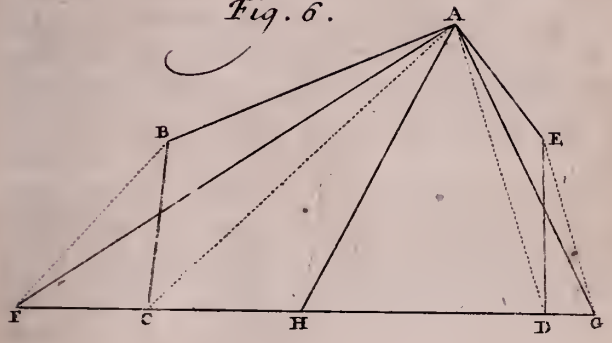


Fig. 5.

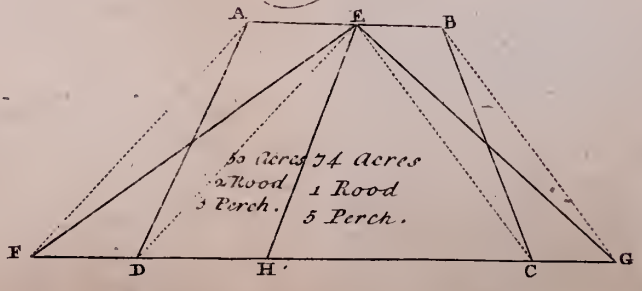


Fig. 4.

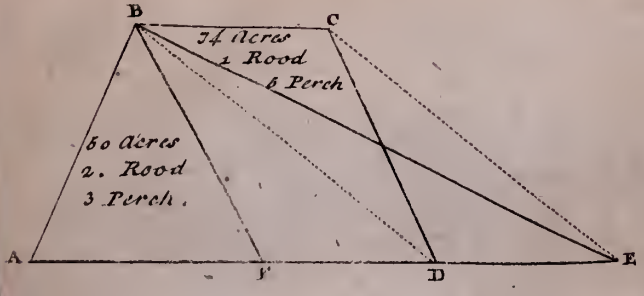
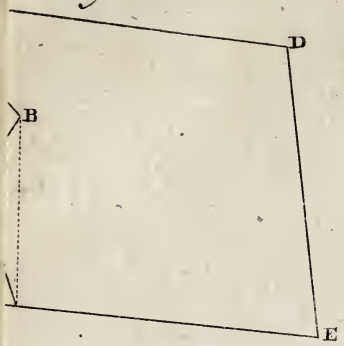


Fig. 7.



Example.

Suppoſe the Trapezium A B C D, containing 124 Acres, 3 Roods, and 8 Perches, is to be divided between two Men; the firſt to have 50 Acres, 2 Roods, and 3 Perches; the other, 74 Acres, 1 Rood, and 5 Perches; and the Line of Diviſion to proceed from B. Firſt, reduce all the Acres and Roods into Perches; then will the Content of the Trapezium be 19968 Perches; the firſt Man's Share 8083 Perches, the ſecond Man's 11885. Secondly, meaſure the Baſe of the Triangle, *viz.* 70 Chains no Links: Then ſay, If 19968, the whole Content, give for its Baſe 78 Chains no Links, what ſhall 8083, the firſt Man's Part, give? Anſwer, 31 Chains, 52 Links, which ſet off from A to F, and drawing the Line F B, you divide the Trapezium as deſir'd; the Triangle A B F being the firſt Man's Portion, and the Trapezium B C F D the ſecond's.

How to reduce a Trapezium into a Triangle, by Lines drawn from a Point aſſign'd in any Side thereof.

A B C D (Fig. 5 of the next Plate) is the Trapezium; E the Point aſſign'd, from whence to reduce it into a Triangle, and run the Diviſion-Line, the Trapezium is of the ſame Content as the former, *viz.* 19968 Perches; and it is to be divided as before, *viz.* one Man to have

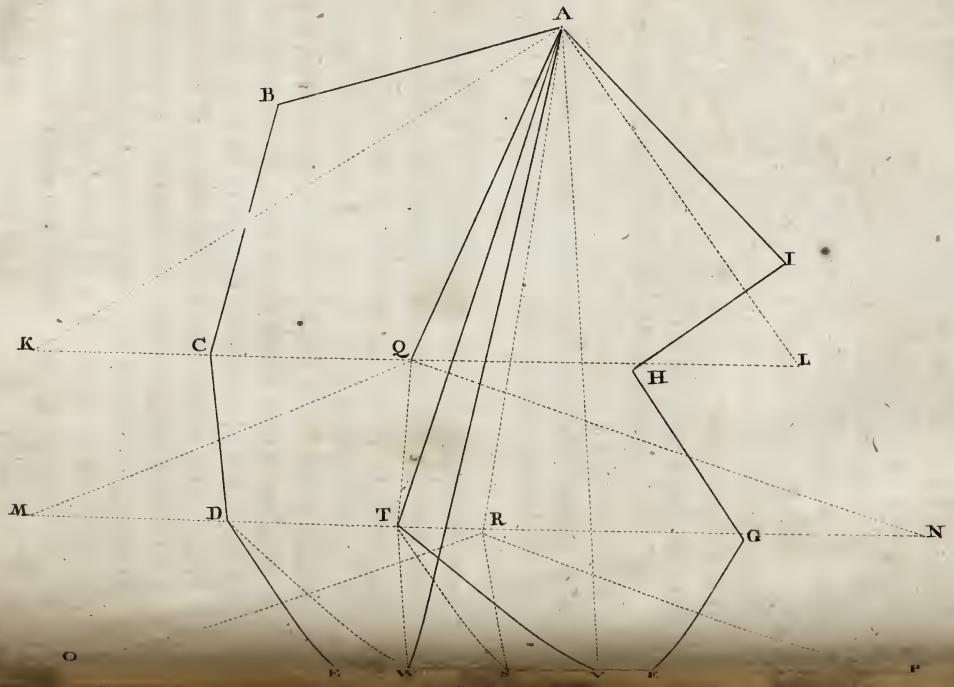
have 8083 Perches, and the other 11885. First, to reduce it into a Triangle, draw the Lines E D, E C, and from A and B make Lines parallel to them, as A F, B G; then draw the Lines E G, E F, and the Triangle C F G, will be equal to the Trapezium A B C D, which is divided as before; for when you have found, by the *Rule of Proportion*, what the first Man's Base must be, *viz.* 31 Chains 52 Links, set it from F to H, and draw the Line H E, which shall divide the Trapezium according to the former Proportion.

How to reduce an irregular five-sided Figure into a Triangle, and to divide the same.

Let A B C D E (Fig. 6 of the next Plate) be the five-sided Figure; to reduce which into a Triangle, draw the Lines A C, A D, and parallel thereto B F, E G, extending the Base from C to F, and from D to G; then draw the Lines A F, A G, which will make the Triangle A F G equal to the five-sided Figure. If this was to be divided into two equal Parts, take the half of the Base of the Triangle, which is F H, and from H draw the Line H A, which divides the Figure A B C D E into two equal Parts. The like you may do for any other Proportion.

If

Fig. 7.



If in dividing the Plott of a Field, there be outward Angles, you may change them after the following Manner.

Suppose A B C D E (Fig. 7 of the next Plate) be the Plot of a Field, and B the outward Angle, draw the Line C A, and parallel thereto the Line B F. Lastly, the Line C F shall be of as much more Force as the Lines C B and B A; so is that five-sided Figure, having one outward Angle, reduc'd into a four-sided Figure, or Trapezium; which you may again reduce into a Triangle, as has been before taught.

How to divide an irregular Plot, of any Number of Sides, according to any given Proportion, by a strait Line thro' it.

A B C D E F G H I (Fig. 7 of the next Plate) is a Field to be divided between 2 Men, equal Halfs, by a strait Line proceeding from A. First, consider how to divide the Field into five-sided Figures, and Trapezia, that you may the better reduce it into Triangles: As by drawing the Line K L, you cut off the five-sided Figure, A B C H I, which reduce into the Triangle A K L, and measuring half the Base thereof, which will fall at Q, draw the Line Q A.

Secondly, Draw the Line M N, and from the Point Q reduce the Trapezium, C D G H, into

into the Triangle M N Q; which again divide into half, and draw the Line Q R.

Thirdly. From the Point R reduce the Trapezium D E F G into the Triangle R O P; and taking half the Base thereof, draw the Line R S, and then have you divided this irregular Figure into two equal Parts, by the three Lines, A Q, Q R, R S.

Fourthly. Draw the Line A R, also Q T parallel thereto; draw also A T, and then you have turn'd two of the Lines into one.

Fifthly. From T draw the Line T S, and parallel thereto the Line R V; draw also T V; then is your Figure divided into two equal Parts, by the two Lines A T and T V.

Lastly. Draw the Line A V, and parallel thereto T W; draw also A W, which will cut the Figure into two equal Parts, by a strait Line, as was requir'd. You may, if you please, divide such a Figure all into Triangles, and then divide each Triangle from the Point where the Division of the last fell, and then will your Figure be divided by a crooked Line, which you may bring into a strait one, as above. This above is a good Way of dividing Lands; but Surveyors seldom take so much Pains about it; I shall therefore shew you how they commonly abbreviate their Work, and is, indeed,

Fig. 8.

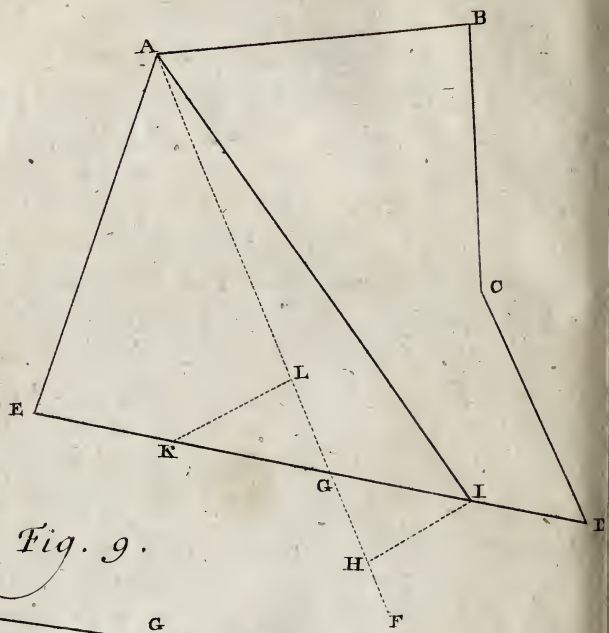
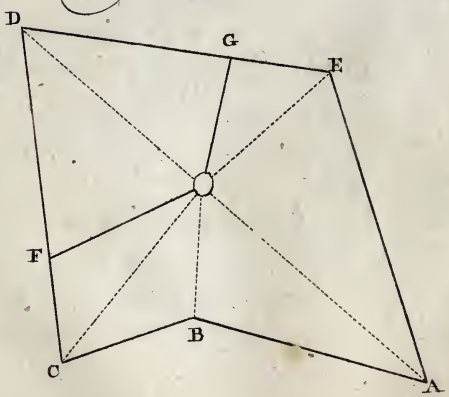


Fig. 9.



An eaſy Way of dividing Lands.

Admit the following Figure, A B C D E, (Fig. 8 in the next Plate) contains 46 Acres, to be divided in Halves between two Men, by a Line proceeding from A. Draw, firſt, a Line, by Gueſs, thro' the Figure, as the Line A F; then caſt up the Content of either Half, and ſee what it wants, or what it is more than the true Half ſhould be; as for Fxample, I caſt up the Content of A E G, and find it to be but 15 Acres, whereas the true Half is 23 Acres; 8 Acres being in the Part A B C D G more A E G; therefore I make a Triangle, containing 8 Acres, and add to it A E G, as the Triangle A G I; then the Line A I parts the Figures into equal Halves.

But more plainly how to make this Triangle; meaſure, firſt, the Line A G, which is 23 Chains 60 Links; double the 8 Acres, they make 16; to which add five Cyphers, to turn them into Chains and Links, and then they make 1600000; which divide by A G 2360, the Quotient is 6 Chains 77 Links. For the Perpendicular, H I, take from your Scale 6 Chains 77 Links, and ſet it ſo from the Baſe A G F, that the End of the Perpendicular may juſt touch the Line E D, which will be at I. Then draw the Line A I, which makes the Triangle A G I juſt 8 Acres, and divides the whole Figure, as deſir'd.

If it had been requir'd to have ſet off the Perpendicular the other Way, you muſt ſtill have

have the End of it but just touch the Line E D, as L K does; for the Triangle A K G, is equal to the Triangle A G L, each 8 Acres. And thus you may divide any Piece of Land of never so many Sides and Angles, according to any Proportion, by strait Lines through it, with as much Certainty, and more Ease, than the former Way.

☞ You might also have drawn the Line A D, and measur'd the Triangle A G D, and afterwards have divided the Base G D, according to Proportion, in the Point I, which I'll make more plain in this following Example.

Suppose the following Field, (Fig. 9 of the next Plate) containing 27 Acres, is to be divided between three Men, each to have nine Acres; and in the Lines of Division, to run from a Pond in the Field, so that every one may have the Benefit of the Water, without going over one another's Ground.

First, from the Pond ⊙ draw Lines to every Angle, as ⊙ A, ⊙ B, ⊙ C, ⊙ D, ⊙ E, and then is the Figure divided into five Triangles, each of which measure, and put the Contents down severally; which Contents reduce all into Perches; so will the Triangle

A ⊙ B
B ⊙ C
C ⊙ D
D ⊙ E
E ⊙ A
} be {
674
390
1238
911
1107
} Perches;

the whole Content being 4320 Perches, or 27 Acres; each Man's Proportion 1440 Perches.

From

From ⊙ to any Angle draw a Line, for the first Division-Line, as ⊙ A; then consider that the first Angle A ⊙ B is but 674 Perches, and the second B ⊙ C 390, both together 1064 Perches less by 376 than 1440, one Man's Proportion: You must therefore cut off from the third Angle, C ⊙ D, 376 Perches for the first Man's Dividing-Line; which thus you may do: The Base D C is 18 Ch. the Content of the Triangle 1238 Perches; say then, If 1238 Perches give Base 18 Ch. no Links, what shall 376 Perches give? Answer, 5 Chains 45 Links, which set off from C to F, and drawing the Line ⊙ F, you have the first Man's Part, *viz.* A ⊙ F.

Secondly, See what remains of the Triangle C ⊙ D, 376 being taken out, and you will find it to be 862 Perches, which is less by 578 than 1440. Therefore from the Triangle D ⊙ E cut off 578 Perches, and the Point of Division will fall in G; draw the Line ⊙ G, which, with ⊙ A and ⊙ F, divides the Figure into three equal Parts.

How to divide a Circle, according to any Proportion, by a Line concentrick with the first.

All Circles are in Proportion to one another, as the Squares of their Diameters; therefore, if you divide the Square of the Diameter or Semidiameter, and extract the Root, you will have your Desire.

Example.

Let A B C D be a Circle, to be equally divided between two Men.

The Diameter whereof is 2 Chains, the Semi-diameter 1 Chain, or 100 Links; the Square thereof 10100, half the Square 5050, the Root of the Half 71 Links, which take from your Scale, and upon the same Center draw the Circle G E H F, which divides the Circle A B C D into equal Parts.

Of laying out new Lands.

A certain Quantity of Acres being given, how to lay out the same in a Square-Figure.

ANnex to the Number of Acres given 5 Cyphers, which will turn the Acres into Links; then from the Number thus increas'd extract the Root, which shall be the Side of the propos'd Square.

Example.

Suppose the Number given be 100 Acres, which I am to lay out in a Square Figure, I join to the 100 5 Cyphers, and then 'tis 100,00000 square Links, the Root of which is 3162 neareſt, or 31 Chains 62 Links, the Length

Fig. 10.

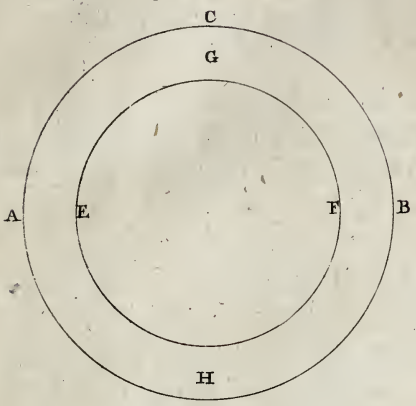
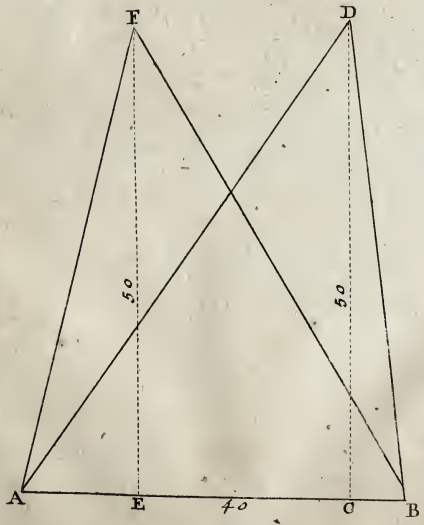


Fig. 11.



Length of one Side of the Square. Again, if it were to cut out of a Corn-Field one ſquare Acre, I add to one five Cyphers, and then 'tis 100000, the Root of which is 3 Chains 16 Links, and ſomething more, for the Side of that Acre.

How to lay out any given Quantity of Acres in a Parallelogram, whereof one Side is given.

Turn, firſt, the Acres into Links, by adding, as before, 5 Cyphers; that Number thus increas'd, divide by the given Side; the Quotient will be the other Side.

Example.

It is requir'd to lay out 100 Acres in a Parallelogram, one Side of which ſhall be 20 Chains 00 Links: Firſt, to the 100 Acres I add 5 Cyphers, and it is 10000000, which I divide by 20 Chains no Links; the Quotient is 50 Chains no Links, for the other Side of the Parallelogram.

How to lay out a Parallelogram that ſhall be 4, 5, 6, *or* 7, &c. *times longer than 'tis broad.*

To do which, firſt, above taught, turn the given Quantity of Acres into Links, by annexing 5 Cyphers, which Sum divide by the Number given for the Proportion, between

the Length and Breadth, as 4, 5, 6, 7, *&c.* the Root of the Quotient will ſhew the ſhorteſt Side of ſuch a Parallelogram.

Example.

Admit it were to be requir'd of me, to lay out 100 Acres in a Parallelogram, that ſhould be five times as long as broad: Firſt, to the 100 Acres I add 5 Cyphers, that makes it 10000000, which Sum I divide by 5, the Quotient is 2000000, the Root of which is neareſt 14 Chains 14 Links; and that, I ſay, ſhall be the ſhort Side of ſuch a Parallelogram, and by multiplying that 1414 by 5, ſhews me the longeſt Side thereof to be 70 Chains 70 Links.

How to make a Triangle, that ſhall contain any Number of Acres, being confin'd to a certain Baſe.

Double the given Number of Acres (to which annex, firſt, 5 Cyphers) divide by the Baſe, the Quotient will be the Length of the Perpendicular.

Example.

Upon a Baſe (Fig. 11. of the next Plate) given, that is in Length 40 Chains no Links, I am to make a Triangle that ſhall contain 100 Acres: Firſt, I double the 100 Acres, and annexing 5 Cyphers thereto, it makes 20000000,

20000000, which I divide by 40 Chains no Links, the limited Baſe; the Quotient is 50 Chains no Links, for the Height of the Perpendicular, as in this Figure: A B is the given Baſe 40, upon any Part of which Baſe I ſet the Perpendicular 50, as at C; then the Perpendicular is C D; therefore I draw the Lines D A, D B, which make the Triangle D A B to contain juſt 100 Acres, as requir'd: Or if I had ſet the Perpendicular at E, then would E F have been the Perpendicular 50; and by drawing the Lines F A B, containing 100 Acres, the ſame as D A B. If you conſider this well, when you are laying out a new Piece of Land, of any given Content, in any Place, although you in your Way want 100 Lines and Angles, yet you may, by making a Triangle to the firſt Station you began at, cut off any Quantity requir'd.

How to find the Length of the Diameter of a Circle, which ſhall contain any Number of Acres requir'd.

Say, as 11 is to 14, ſo will the Number of Acres given be to the Square of the Diameter of the Circle requir'd.

Example.

What is the Length of a Diameter of a Circle, whose superficial Content shall be 100 Acres? Add five Cyphers to the 100, and it makes 10000000 Links; which, multiply'd by 14, *facit* 140000000; which, divided by 11, gives for Quotient 12727272, the Root of which is 55 Chains 67 Links, and better, almost 68 Links; and so much shall be the Diameter of the requir'd Circle.



CHAP.

CHAP. IV.

Of COURT-YARDS.

Of the ſeveral Parts of which GARDENS *are compos'd.*

BEFORE I enter upon the main Deſign of this Work, *viz. Rural* and *Extenſive Gardening*, it will be requiſite to examine into the ſeveral Parts and Proportions of which Gardens are compos'd, that ſo thoſe ſeveral Parts, and the particular Proportions of each being adjuſted, and ſome Deſigns at large given for the interior Centers and Diviſions of Wood, and other Parts of a Garden, the latter Part may be underſtood with more Eaſe; for that being of an extenſive Nature, and the Scale very ſmall, 'tis impoſſible to ſhew theſe Particulars to any

great Nicety, so as to recommend them to Use, and the Practice of Gardeners and Designers.

Mr. *James*'s Translation, indeed, goes before; and, besides, he has had the most magnificent Gardens of all *France* to view, and he has certainly chose the very Marrow and Beauty of all those excellent Designs; so that, in this Point, I must expect to fall very far short of him; which will be, I hope, excus'd, when 'tis consider'd, that I have writ this Treatise in a Country that does not yet abound with such truly noble Gardens as *France* does, tho' we are by Nature so much better enabled to do it. But this will, 'tis hop'd, tempt some of our curious *Planometrians*, in Time to come, to finish what is here so imperfectly begun.

And for the rest, if Providence permits, I hope, on the Spot, in these Countries, to collect what may yet farther advance us in the Knowledge and Improvements of Horticulture, and other rural Amusements.

Of COURT-YARDS.

COURT-YARDS are by the *Latins* call'd *Areæ, quia ibi arescunt fruges*, says *Varro*, an ancient Writer of Husbandry amongst the *Romans*; and with us, *Court-Yards*; *Court*, from the *French*, and *Yard*, a Term of our own, and is, in its proper Signification, an open

open, airy Drying-Place, *quia exaruerit*, as the Dictionary expreſſeth it, and bounded with a Wall, Hedge, or Pale, or ſome Circumſcription, as Courts of Law and Juſtice are; but when particularly apply'd to the Matter in Hand, ſignifies thoſe little Diviſions that lye contiguous to a Gentleman's Houſe, and other his Offices of Convenience.

But to the Work itſelf, *viz.* To the Proportion and Deſign, and to the Manner of making of them.

Where-ever, then, the Deſign admits of, or requires but one ſingle Court, the Length thereof need be no more than once and an half or twice the Width between Terrace and Terrace. But in very great Edifices and Deſigns, a double Court ſeems to add a great Magnificence thereto; 'tis there that Grandeur is abſolutely neceſſary, when in Buildings of a leſs Account, a ſingle Court, according to our allotted Proportion, will very well anſwer the Purpoſe.

I have, in Plates the 1ſt and 2d, given ſuch plain Directions, as have occurr'd in the Diſpoſition and making of Court-Yards, whether publick or private, of their Uſe, and the Beauty and Convenience they add to any Edifice.

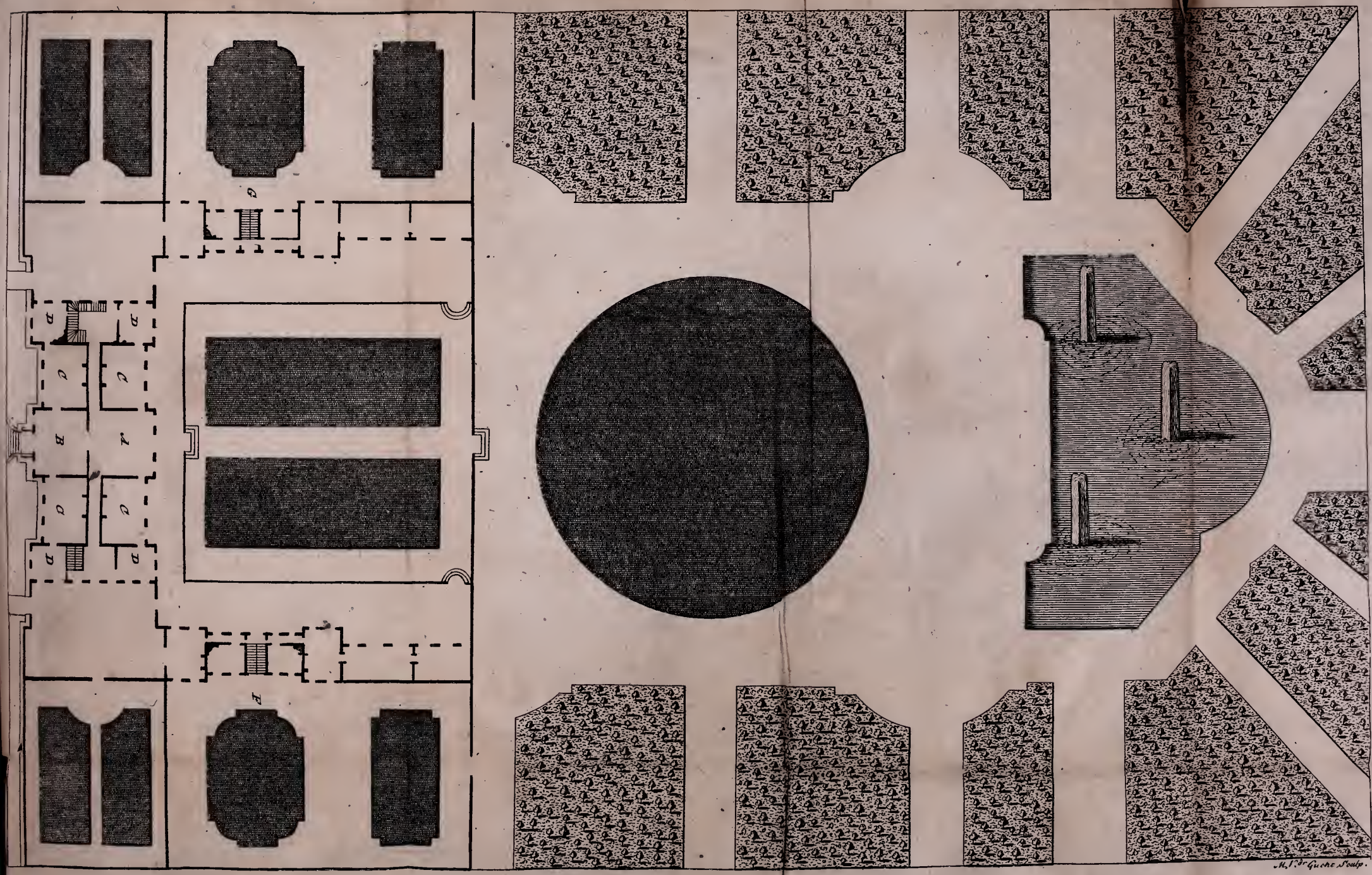
In the firſt Place it is requir'd, that Court-Yards ſhould have a depending Level, at leaſt an Inch in ten Foot, for the quick carrying off of Water, and that it may lye dry, as much as poſſible. To that End, there will be found in Plate the 25th a circular Line, to which all

all the reſt of the Court ſhould lye rounding, under which there ought to be Drains for the Conveyance of the Water. This Declenſion, that is juſt mention'd, is not only of Uſe, but is alſo of conſiderable Advantage in the elevating the Houſe, and giving a good Proſpect to the diſtant Beholder, which is what many Houſes want. And 'tis not of the leaſt, but, on the contrary, the greateſt Beauty, Advantage, and Conveniency imaginable, to have a Terrace-Walk round, or by the Side of, a Court; for by it the Houſe is ſtill elevated the higher to any Perſon that comes in upon the grand Level of the Court-Yard, be he either on Foot or Horſe-back; beſides the Cleanneſs, Decency, and Convenience there is for Servants and others, that paſs on Foot from one Office to another. In Truth, it ought to be the chief Care of any Surveyor, to give his Houſe all the Elevation he can; but of that more by-and-by.

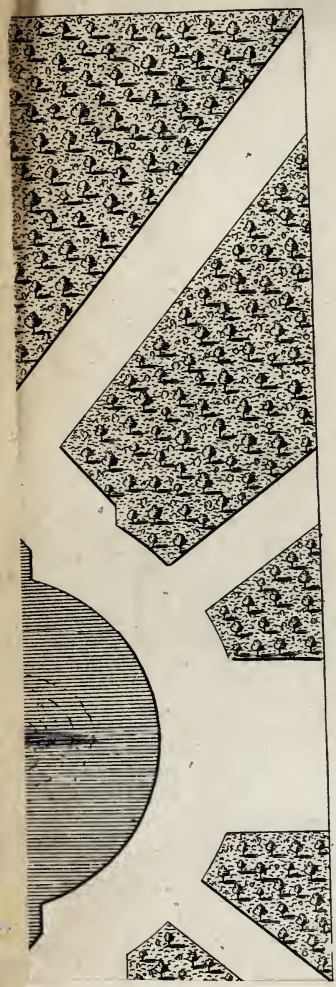
In the 2d Place, the Foundation of a Court-Yard, or, to ſpeak more intelligibly, the pitching, ought to be firmly fix'd in the Earth. But theſe being the Employs of a particular Trade, I ſhall leave it to them.

A Deſcription of the 25th Plate, (of Court-Yards.)

The principal Part of my Deſign in this Plate, is to ſhew my Reader (by Way of Preliminary)



M. I. de Guche Sculp.



liminary) the Nature of a grand Court, which may serve as a Specimen in a very large Design, as it is here particularly calculated for a middling one. I have not been (neither, indeed, is it my Business to be) very exact, either in the Magnitude or Distribution of the several Rooms in a Building; but every Gardener ought to know the Disposition of the Building in general, that he may conduct his Design accordingly. But as this Plate has chiefly Relation to the great Court, there is no Occasion to expatiate at present upon those Matters, but leave them to be treated of, or describ'd, in some other Plate or Place.

The Peruser may then collect by the Scale, that the Width between the Wings is about 230 Foot, and the Breadth of the Wings 50 Foot, which make 280 Foot; but, as we generally account the Measure between the two Wings for the Breadth, 'tis there I fix my Standard; and have therefore made the Length from the great Hall-Door to the Gate-way near 330 Foot; which is near what I propos'd to allow for the Proportion of a Court-Yard, supposing there is to be allow'd (as, indeed, there ought to be) a large Parade without the Gates, which, with all other contiguous Yards and Courts, will be describ'd in a particular Plate, upon a less Scale in its due Place.

In the mean while, as to the farther Description of this, there is in this Design not only round the Building, but also quite round

the

the Court, a Terrace-Walk, which is what, in my humble Opinion, is very deficient in all Books and Designs that I have seen; for it is not only a dry clean Pavement to walk round, and view the Edifice, but also thereby the Building itself appears considerably the higher. And tho' it may be objected, that the Terrace at the farther End will stop the View, I shall advise, that this Terrace is only to be us'd, where a handsom depending Level can be had, (as it is here suppos'd it may) for which Reason here is suppos'd 3 Foot 6 Inches fall in the Court itself, from A to B, the Height of the Terrace above A is two Foot, and the Basement is higher than the Terrace at the Entry into the Hall, five Foot, besides the Height of a Man, which is at least 5 Foot more, is in all 10 Foot and an half; and this is (allowing two Foot and an half for the Height of the Parapet above the Terrace-Walk) full 3 Foot higher than the Terrace-Walk at the End of the Court. In order to take away all Objection, I have likewise, at the Bottom of the Offices, at C, fall'n two Foot more; so that then the Floor of the Hall is full five Foot above the Parapet of the Terrace at the End of the Court; and if to that be added 5 Foot, the common Height of a Man, I can't conceive that any Objection can be made to this Way of Design.

In Addition to the foremention'd Convenieney of a Terrace-Walk round a Court, let me mention, that it likewise disposeth of all Stuff

Stuff that is dug out of Cellars, and the other Foundations of a Houſe, and all other waſte Rubbiſh, and Clay, as uſeleſs Ground, that would be to cart away; and therefore it is recommended on that Account: And the Reaſon why a Terrace-Walk at the End is urg'd, is the Expence it ſaves in Iron-Work, which, at beſt, is but a Kind of Net-Work, I had almoſt ſaid, contriv'd on Purpoſe to catch thoſe Perſons in, who are ſo unwiſe as to run to that great and unneceſſary Expence.

If therefore the Ground ſhould riſe from the Houſe, inſtead of fall, one ought by all means to ſink it, and for a Fence to dig a Graft, or Ditch, on the Out-ſide, (of which much more will be ſaid, when we come to the fencing in of a Garden) for the effectual Security of this main Court, and the other Offices, *&c.* But in this whole Matter, *viz.* in placing the Terrace-Walk and Baſement of a new Building, there ought to be a great deal of Care. Come we now to ſpeak of the Superficies of this and all ſuch Courts.

And here it muſt be obſerv'd, that, for the Conveniency of coming in for a Coach and Horſes, I have given 70 Foot Diſtance from the Edge of the Terrace, at the Bottom of the Court, to the Edge of the Oval; and the other End is not above 16 Foot from the Steps of the Terrace, at the upper End next the Houſe, mark'd A; for 'tis eaſy to conceive the Difficulty a Coach and Six would meet with at the Entrance, were it any otherwiſe.

It

It has formerly been the Method, to place a Fountain in the Middle of Court-Yards, or to make, in its Room, a large circular or oval Plott; but this is altogether disus'd at present, since thereby, when there are a great Number of Coaches, it would be no small Trouble for them to stand at Quiet, in so narrow a circular Way, as is commonly allow'd; when by this Means, those that are unemploy'd may easily move out of the Way, upon this Oval, (or any such like Figure) and there remain, 'till they have Occasion to move. In Consequence of this 'tis therefore now the Manner, to pave the grand Court all over; and that they may appear (as all other superficial Ornaments about Country-Seats do, or ought to do) with some Variety, they are commonly pitch'd Chequer and Star-wise, or circular, or in such Form as the ingenious Artist pleases, with different-colour'd Stones. The Method here taken is more easily discover'd by inspecting the Plate, than by many Words.

The last Thing I shall mention, as worth our Notice, is the particular Level which is given to this Court, in order to carry off the Water the better, and the Method of setting them.

The Center of the Oval is exactly a dead Level from A; so that after you have fix'd those two, and mark'd out the great Circle, or Gutter, (under which there ought to be a Drain, two Foot square, with Grates at every twenty Foot Distance) then, I say, for its Level,

Level, you must at every ten Foot fix in a Stake; or, because of the Drain, let it be rather of Brick or Tiles laid upon one another, 'til they are at their proper Level, allowing an Inch and an half Fall to every ten Foot, and that will make the true Level, all the other Lines swimming (as we commonly term it) from the Plinth of the Terrace-Wall that is on each Side the Court, and from the Center of the Oval down to that Level in the Hollow, Gutter, or Drain.

As the Court is thus pitch'd, and of a depending Level, if it be a Stone Country, all the Terraces round should be pav'd, and even that that is at the farther End of the Court. And this Terrace must of Necessity be of a dead Level, that it may answer the Basement and Plinth of the main Building, and likewise the Wall, or Parapet, that supports the Terrace, all the Lines lying swimming from it, down to the Hollow, as has been before observ'd.

It is easy to conceive the Neatness, Beauty, and Cleanness, that there is in Courts of this Kind, more than in those whose Horse and Foot go together. Besides, that this little Elevation is of Advantage to the Heighth of a Building, every Body will, I dare say, readily own; so that a Terrace-Walk round the Court of a magnificent, or even of any small Rate of Building, is absolutely necessary, if the Owner would keep his Foot-Passages clean, and give a proper Elevation to his Building.

I hope I ſhall be excus'd preſſing of this ſo much, becauſe we are every Day ſeeing the contrary; except in Buildings that are under the Management of ſome of the top Architects, amongſt which may be deſervedly plac'd Sir *John Vanbrugh*, and Mr. *Hawkſmore*.

I ſhall do no more in this Chapter, but add ſome few explanatory Notes upon the general Diſpoſition of the Plan of this Edifice, which does in a great Meaſure determine the Nature of all the adjacent Courts.

1. The great Hall.
2. The Salloon Room.
3. The great Dining-Room.
4. The little Dining-Room.
5. The Green-Houſe, or Gallery.

There ſeems to be no Occaſion of marking any of the reſt, they being either private Apartments or Offices; and the little Gardens that lye contiguous thereto, may be eaſily obſerv'd to anſwer their Deſigns and Uſe, which is Decency and Plainneſs; but if any ſhould be ſo curious, as to deſire them to be drawn into Borders, or Box-Works, they may apply themſelves to ſeveral Patterns in this and other Books; and the Truth is, 'tis in that moſt Gardeners are excellent, and ſo need little Introduction, their Endeavours ſcarce reaching any farther.

And

And, in order to exemplify the whole Design, in one of the following Plates will be epitomiz'd the several Parts in one Design, with their Manner of laying out, *&c.*

A Description of Plate the 26th.

Altho' the first Design be truly noble in its Kind, yet it must be allow'd to be very expensive withal; besides, in Forest or Hunting Seats (as well as the Seats of the more inferior Part of the Gentry) where the Nobility pass away in Happiness Part of their Time, a little more Rurality, and less Expence, will do as well, or better. I can't, indeed, tell how far a Person of my Profession may be allow'd the Liberty of censuring or reproving any Extravagancy of Design in some of inferior Rank of our own Country; but it is certainly too true, that some of them do very much exceed the Limits of their Honour, as they do also of their Estates, in great Designs of Building, and a very expensive Way of Gardening likewise. And whoever takes a Survey of these Kingdom will find, that to this is owing the many confus'd, unfinish'd Schemes so very common in several Parts thereof.

And, in Truth, this first setting out, is generally the Rock that all Mankind split upon; for such Expences are, generally speaking, increas'd double to what they were computed at, and by that Means the Owner's ready Money is commonly expended, before he hath half

finish'd the Design; and the Remainder is too often, by unavoidable Necessity, left in the utmost Confusion.

I say then, in the first Place, Persons of an inferior Rank ought to be very moderate in their Designs, for building Court-Yards, Offices, *&c.* that there may the more remain for the Embellishment of the adjacent Fields, Wood, *&c.* since this will add much more to their Satisfaction and Profit, than the most sumptuous Palace can do. One is (as an ingenious Author observes) from the Moment of its Erection, hastening to its Ruin, while the other is continually improving upon his Hands, and furnishing him with all Necessaries of Life; every Day supplying him with new Objects and Variety to his Taste, Smell, Sight, *&c.*

A private Gentleman ought therefore (in Wisdom) not to begin his House much larger than what is in this Design; he ought to be very moderate and plain in the Furniture of his Building, and of the Magnificence of his adjacent Gardens and Court-Yards.

This may, perhaps, be thought an improper Chapter for the Inculcation of these Matters; but, as I am going thro' a general Course of Country-Business, I can't pass this Place without it, being, generally, the very Spot and Time, from which all injudicious Undertakers do commonly date their Ruin or Disgrace, and from which the more considerate and frugal commence the greatest Happiness,

neſs, that they are (next to the divine Peace and Tranquility of their own Minds) capable of procuring for themſelves in this World.

But to go on. The Length of the South Garden Front is about 80 Foot, and the Breadth 35; but, by contracting the Scale, the whole Deſign may be enlarg'd. And if the Owner can with Convenience, it would do ſtill better, if the Garden Front could be 100 Foot; but this may do, tho' the Rooms are but ſmall, which is in theſe Times very well approv'd of.

A, in Plate the 26th, is the Hall, B the Dining-Room; CCCC are Drawings, or Bed-chambers, and D D D D are Cloſets.

I don't pretend to be exact as to the Building Part; but ſomething like this is what many Surveyors recommend; and this I leave to better Judgment.

I would always adviſe againſt building many Court-Walls, where Frugality is requir'd; they ſoon run up to a great deal of Money; but 'tis hard to avoid making ſome few, to encloſe theſe Court or Wood Yards, and to keep Cattel and Deer from running into the very Houſe; but if any Perſon would content himſelf with Elm-Hedges, or, which is better, (but ſlower of Growth) Holly-Hedge, this would be an impenetrable Fence, would break all the Winds better than Walls, and would always appear in a Foreſt Manner, and conduct the Eye as well as a Wall.

To effect this the better, you are to plant a small Holly Hedge, or (if near *London*, where Yews and Hollies can be got large) a Hedge four, five, or six Foot high, in the very Line where you might have intended your Wall, *viz.* ranging from the Angles of your Building, as in all Designs they do, or ought to do. But, if the Holly Hedge be not above a Foot high, it does, by that means, make no Manner of Show at present; and therefore there ought to be plac'd, about 3 or 4 Foot behind it, a Row of Hedge-Elms, and those will make an Appearance at once, will shrowd the Holly 'til it is grown up, and will themselves, after that, be fit to prune into Standards, or to plant promiscuously in our rural Plantations.

But it must be noted, that this can't be done near or in Town, but only in the Country; the Town requires high Walls quite round it, but the Country may be more open and less guarded. And now let us follow our Description.

A is the Hall, B the great Dining-Room, C C C C are all Drawing-Rooms, or Bed-chambers, and D D D D are Closets; E is the common Vestibule for Persons that come about Business, F the Kitchen, and G the Laundry-Offices.

This is all I take to be necessary to say as to Court-Yards, or the little Gardens adjoining to the Building. 'Tis obvious enough to every Body, that the other little ones are either to be pav'd, or to be laid with Grass and Grave-

a

according as they are either design'd for Use or Beauty. If they are adjoining to the private Apartments of Ladies and Gentlemen, then Flowers, and Edgings, of Thyme, *&c.* according to the common Method, or their particular Desire; but if adjoining to the Kitchen, for those Kind of Herbs that the Cook is wanting on all Occasions: If to the Laundry, a Bleaching-Yard; and if to the Stables, with Paving, *&c.*

And with this I shall finish what I have to say in Relation to Court-Yards. What I would advise chiefly, is, by all Means to avoid the Expence of long Court-Walls, especially in Rural and Forest Seats. You are but just enter'd upon your Work, and you must consider, that you have a great many Things to do with your Money; but if you do build in a Town, you must in some Measure submit to it.

But before I quit this Section, I observe, that as soon as ever you are out of Doors, you are in a Forest. This a good Designer would desire by all Means: Wood is of so charming a Nature, as well as Use, that no Man would cut any of it down, except he could not possibly help it, and would only clear it away, that he may have an open Breathing-Place before him, with Ridings thro' it. Nevertheless, if it be not already grown, it may be plac'd farther; but of this more anon.

CHAP. V.

Of TERRACE-WALKS.

THE Terrace seems to have been us'd a considerable Time since, the *Latins* terming it *Agger*, or *Aggestus*, as may be suppos'd from *ad* and *gero*, to collect or gather together of an Heap; *Vitruvius* (that celebrated *Roman* Architect) and *Suetonius*, call it by the Name of *Pulvinus*, a Garden-Bed, or rais'd Walk of Gravel; *Macrobius*, by *Solarium*, a Sunny Bank, or Walk: But the neareſt of our Derivations in *Engliſh*, is from the *French*, *Terrace*, or *Terraſſe*; and they from the *Italians*, (from whom they, and almoſt all *Europe*, derive their Terms of Art relating to Building, Gardening, *&c.*) *Terraza*, *Terrazare*, ſignifying with them the removing and banking up of Earth, from one Place into another.

But be the Derivation as it will, it is very well known in theſe *European* Countries, and particularly with us, to be a ſmall Bank of Earth, laid out and trimm'd according to Line and Level, being neceſſary for the proper E-

levation

levation of any Perſon that walks round his Garden, to view all that lyes round him. And this Elevation is ſo neceſſary, that all Gardens muſt be eſteem'd very deficient, that have them not: And, to be plain, I think it the greateſt Fault imaginable in the Author of the *Theory and Practice of Gardening*, that he has not been more particular in that Reſpect, eſpecially that he has not deſign'd them next to his main Building, where they are ſo abſolutely neceſſary, both as to Uſe and Beauty, that I dare pronounce a Seat of no Value without them; and, beſides, where-ever the Houſe is to be new built, there is no Poſſibility of diſpoſing of the Earth, Clay, Rubbiſh, *&c.* that neceſſarily comes out of the Cellars and Foundation thereof, but this; which we muſt otherwiſe ſuppoſe (amidſt a thouſand needleſs Works) is to be carted away, to fill up ſome Hollow or other, which had been better left undone perhaps likewiſe.

Of Terrace-Walks there are ſeveral Kinds, as they are particularly us'd.

The 1ſt, is that great Terrace that lies next the Houſe.

The 2d, Side, or Middle Terrace, that is commonly rais'd or cut out above the Level of the Parterre, Lawn, *&c.*

The 3d, Thoſe that encompaſs a Garden; and

The 4th, Many that lye under one another, as being cut out of a large high Hill; these are differing, in some Respect or other, from one another. I shall, in the ensuing Plates, give the Reader the Plan and Use of them all, with such Observations and Directions as are made thereon.

I shall only make some general Observations thereon, before I come to the Plate it self; such are those concerning the Height, Breadth, but little of the Length of Terraces, since that depends on Pleasure. As to the Breadth of all Side-Terraces, 'tis, generally speaking, decided by its Correspondence with some Pavilion, some little Jettee of Building, but most of all by the Quantity of Stuff we have to spare for such Purposes. As the Side-Terrace in a Garden, ought to be never less than twenty Foot, so there is little Occasion to make it wider than forty; but for the Height, which is the chief Occasion of this Paragraph, we may note the Practice of several has been something different one from another; some allowing it to be five Foot high, (which is altogether extravagant) and others more or less, according to their respective Fancies, without any certain Rule.

But the best and most exact Practitioners allow no more than three Foot and an half, and in a narrow Terrace-Walk, and a small Garden, three Foot, and sometimes two Foot and an half higher, are sufficient for a Terrace; then for a Terrace of 20 Foot wide, two Foot and

and half an Inch, or two Foot nine Inches, is ſufficient; but when it is 30 or 40 Foot, and the Garden proportionably large, 3 Foot, or 3 Foot and an half, is abſolutely requir'd.

As to the general Proportion of great Terraces, I refer you to the Scheme and Scale of Plate 27, Fig. 6, by which it appears, that the Terrace is near 100 Foot wide. The Reaſon why I make it thus large, is, becauſe I have often (I may ſay always) thought that the Terrace-Walks under Buildings, in almoſt all the Deſigns I have ſeen in *England*, are too narrow, ſo narrow, that one can't, without a great deal of Inconvenience and Pain, view the Buildings as one walks along. And what gave me the firſt Impreſſion of this Kind, was that truly magnificent and noble Terrace-Walk belonging to the Right Honourable the Earl of *Nottingham*, at *Burleigh on the Hill* in the County of *Rutland*; any Perſon that has once ſeen this, can't but be mightily ſhock'd to ſee little creeping narrow Terraces under great Buildings. For my own Part, I muſt confeſs, that that Deſign creates an Idea in my Mind greater than I am well able to expreſs; and tho' every Perſon that builds, has not ſo noble an Elevation and View, yet Perſons in a more level Country, may help themſelves very much, and therefore there is the more Occaſion for ſuch an Elevation. And this reflects ſtill more upon Mr. *James*'s Tranſlation, where there is no ſuch Care taken at all,

nor

nor any Elevation, but what Nature has resolvedly thrown into the Way; and, in Truth, it looks very mean, to come out of a Building upon the grand Flat of a Lawn or Parterre; and is a very great Disadvantage to the Gardens at *Hampton-Court*, if it could have been avoided.

Observation on Plate the 26th.

Figure the 1st is the natural Fall of a Hill.

Figure the 2d shews the Descent from the Basement; and it also demonstrates how easily Gentlemen may, with a little Care at first, give their Buildings an handsome Elevation.

Fig. 3 is the Profile at the End of the Parterre; and Fig. 4 and 5 are the Boundaries of a Garden by a Terrace-Walk and Graff, and by a Terrace-Walk and Water. Fig. 6 is the Plan of the great Terrace, with Groves of Elms at each End.

To pursue the Thread of our Directions.

When you first begin to build, and make Gardens, the Gardener and Builder ought to go Hand in Hand, and to consult together; because the Gardener has often Occasion, in the Course of his Works, to make Use of all the waste Stuff that the Mason or Brick-layer digs out of the Foundation of the House; and 'tis a very great Fault, and likewise an Expence, when Persons (as 'tis the common Method) first, dig the Earth out of the Foundations, and throw it out in promiscuous Heaps, and after that have it to remove again,

to

to fill Cart, shoot down, and spread again, all which Works aggrandize the Expence of an Undertaking, when there is no Occasion for it, when at the same Time it is dug out of the Foundations, it might be carry'd away and shot down in the very Place where it is wanted, without any more to do. And to this End, the Gardeners Scheme ought to be laid at the same Time the Building is carrying on, and, in Truth, to be finish'd out of Hand, that it may be growing while the Edifice is carrying up.

I can't chuse but press again this Care of disposing of the Stuff as soon as it's dug out of the Foundation of the House; for People are generally in such a Hurry and Amaze, and Gardeners take so little Notice of this one Particular, that I have often seen these coarse heavy Materials tumbled backward and forward; and I dare aver, in a Design now carrying on, near 500 *l.* has been thrown away in this one Article of tumbling their Earth backward and forward, when it might have been dispos'd in its proper Place at once; the Fellows all the while muddling on, as if they were amaz'd; as for Labourers, they care little for that, tho' some of them often see it; it should therefore be the peculiar Care of the Gentleman or his Gardener.

To return to our more immediate Rules in Practice. You are to chuse as high a Mold or Plan as you can, to fix your House on; and there, after the whole Design is cock-

spitted

ſpitted out, (as will be taught more by-and-by) the Maſon, or Brick-layer, is at the Center of the Garden-Front, to erect a Square Peer, or Baſe of rough Stone, (as the Baſe A, Fig. 1) on the Top of which he is to lay a ſmooth flat Free-ſtone Cap, and to make it exactly level, that by laying thereon a long Rule, you may at any Time turn it about, and take a general Survey of all your Levels. This Stone, with its Cap, ſhould be juſt the Height of the Top of the Baſement, being the Level of the grand Floor; or, to ſpeak more plainly, the Level of the Great Hall, Dining-Room, *&c.* and the Rooms that lye contiguous thereto.

This Baſe-Peer ought to be fix'd with Judgment, according to the Nature of the Ground, and the Height you intend the firſt and grand Floor ſhould be; which, generally ſpeaking, ought to be 7 or 8 Foot above the natural Ground, allowing three Foot and an half for the Height of your grand Terrace, and four Foot, or four Foot and an half for the Height of your Baſement above that grand Terrace; which four Foot, or four Foot and an half, we ſuppoſe to make eight or nine Steps, for the Number of Steps going up from off the great Terrace, to the Level of the Hall-Floor.

This pitching the grand Floor ſo high, beſides the Elevation it gives the Houſe, is very convenient, in as much as thereby the Cellars are leſs damp and moiſt; and where-ever Springs are apt to riſe, it is attended with the greateſt

greateſt Advantage imaginable. Beſides which, the Expence of digging the Cellars, is conſiderably leſſen'd; only ſo low it ought to be fix'd, that the Cellars may afford Stuff enough therefrom, and from the main Foundations, to make the Terrace-Walks, and ſuch like Eminences, that are projected, and which the Nature of your Ground abſolutely requires.

And before I go any farther, I can't but recommend the carting out all this Earth or Clay, rather than wheeling, becauſe one is a very great Charge more than the other; I have obſerv'd, that one ought never to wheel above 15 or 20 Yards at moſt, except it be in ſome Caſes, where there is not a good Supply of Stuff, or where ſix or eight Men can't ſtand to work, to keep the Carts always moving: In this Caſe, in order to forward the Work as much as poſſible, let one Cart always be ſtanding, with two Horſes ready harneſs'd, and another always going; and this makes an incredible Diſpatch, if you have ſix, eight, ten, or twelve Men always digging and filling, and three or four ſpreading and levelling it, as it is carry'd out into the Terrace-Walk, or other Hill.

The Terrace-Walk, or Mount, being already ſtak'd out, and Care taken that they do not lay the Earth or Clay, ſo taken out, too high, allowing always 8 or 10 Inches for good Mold, Turf, or Gravel, and in the finiſhing the Plan or Surface of this Walk.

Let

Let us come now more particularly to the Profile. The Pillar being fix'd, as before directed, we allow five Foot, or five Foot and an half, for the Height of the Baſement above the Terrace, and three Foot, or three Foot and an half, for the Height of the Terrace above the grand Plan of the Lawn or Parterre, as appears by the Scheme; we then allow an Inch, or an Inch and an half, in ten Foot Fall, for the Deſcent of that Place, or if the Ground be riſing, leſs will ſerve; but one would by no means allow leſs than a quarter of an Inch in ten Foot Fall; altho' Sir *Jonas Moore*, and other Artiſts, in their Water-Levels, are, upon other Occaſions, content with leſs.

The Length of the Parterre being then 500 Foot, we need not make the whole Fall (except oblig'd by the Deſcent of the Ground) leſs than three Foot and an half, or four Foot; nor ought we to make it more than ſix Foot. And this laſt is what I have obſerv'd in the Profile.

If the grand Walk continue thro' a Wood, or on a Plain, it ought to be carry'd with the ſame Deſcent; tho' after one is got 2 or 300 Yards Diſtance from the Houſe, one may take the Liberty to ſwerve from it; but it ſhould be rather a rolling Level, than a ſtrait ſtiff one, than which nothing looks more cramping and ridiculous, and is a Blemiſh in a great Deſign that might be nam'd. Where-ever, in that Caſe, the Ground falls off too quick, the

Level

Level ought to ſwim, as it were, over Hill and Dale; or if it be a ſtrait Line, it ought to fall at once, by a Slope, with ſuch Diviſions to anſwer it as the Nature of the Place requires. This is to be ſeen at Letter D; and the rolling Level appears at Letters e e e. In this, nevertheleſs, the Walk ought to be a dead Level, croſs-wiſe. To ſum up all, the Fall from the Ground-Floor of the Houſe (in this Profile) to the Extent of the Park-Wall, or of the grand Walk, as far as one would have it appear a Garden, is 24 Foot 6 Inches, which is a very proper Fall, and is thus accounted.

	F.	*I.*
The Baſement	5	0
The Fall from the great Terrace	3	6
The Fall of the Parterre	6	0
The Fall at Letter D	3	6
The Fall of the rolling Level	6	6
	24	6

Obſervations on Fig. 3, *in the* 3*d Plate.*

This Figure is put to demonſtrate the Profile of a Parterre, croſs-wiſe, with the Terrace-Walks on each Side; and is what in general is, or ought to be, near upon a flat or dead Level, ſince it is to anſwer the Length of the grand Terrace, the Level and Plinth of the Houſe, *&c.* And this Scheme fully ſhews where it ought to be flat, and where convex; as

alſo

alſo the Width of the Terrace and other Walks, and the horizontal, perpendicular, and hypothenuſal Lines thereof.

And this is ſuppoſing the Terrace be rais'd entirely of Earth, Clay, *&c.* brought from other Places; for where-ever it is cut out of whole Ground, it is in it ſelf much the cheaper. But Terrace-Walks are ſo very uſeful, as well as beautiful, that one would by no means fail of having theſe Side-ones; ſince if there is not Stuff to ſpare out of the Foundations of a Houſe, or if the Houſe be already an old one, or built but ſome Time ſince, by ſinking the Levels in the Parterre or Lawn, 'tis an eaſy Matter to procure Stuff enough for any Occaſion, eſpecially this; and we may add thereto the Nearneſs of its Movement, which is not a ſmall Article.

When, therefore, in order to proceed regularly in the Conduct of our Garden, the Terrace is done, or ſtak'd out only, you are to go to the Parterre, and at the Head thereof you ſink your Level three Foot and an half for the Fall of the Terrace, which, according to two Foot and an half horizontal to one Foot perpendicular in the Fall, you are to make the Baſe of your Slope eight Foot nine Inches horizontal. We do, in many Places, allow three Foot horizontal to one Foot perpendicular; but this there is not always Room for; but leſs than two we never ought, nor more than three we need not; but this I have mention'd elſewhere: For tho' there are ſome

that

that are indiſcreet enough to make but one Foot and an half, nay, ſome not above one Foot, horizontal to the ſame Perpendicular, it muſt be a very great Fault; for if the Slope be deep, there is no ſtanding to mow upon it; neither if the Ground is tolerably good, will the Graſs proſper well, much leſs if it be hot, burning, gravelly Land; but for rolling, there is not Room for ſuppoſing any ſuch Thing, which is what makes our Slopes the fineſt of any Ordering or Dreſſing we can beſtow upon them, next to mowing.

And I muſt digreſs to obſerve, amongſt thoſe that have either by Practice or Writing inculcated this Error, in that Book of Mr. *James*'s, in which, in his Directions for cutting of Terrace-Walks out of all Hills, he has, in ſeveral Slopes, not allow'd above one Foot horizontal to one Foot perpendicular; which muſt be very ill Advice, and I could not but caution the World againſt it.

But to re-aſſume our Practice in the ſtaking out and levelling this Profile Line; fixing the Level at D, turn it long-ways of this Line, which will crop the Head of the Parterre; and fixing Stakes in at L, you have the Bottom of your Side-Terraces, from which, after you have meaſur'd out eight Foot nine Inches, the horizontal Line of the Slope, you may raiſe the Height three Foot ſix Inches, which being done on each Side, you may ſoon level the Tops of your Terrace-Walk, as alſo the Bottom-Lines of your Parterre.

Having thus done, you are to fall your ſix Foot; but if your Ground does not require it, five or four Foot will be Fall enough, in reſpect to the Work it ſelf. The Method how this is done, is ſufficiently laid down in *Directions for uſing Garden-Inſtruments*, &c. (p. 60) After you have thus fix'd the Stake to its true Fall, at the lower End of the Parterre or Lawn, you are to repeat the ſame Work again as you did at the upper End, by twining the Level a-croſs the Bottom of the Parterre; and having thus finiſh'd your Levels at the Bottom, as you did before at the Head thereof, you are ſufficiently prepar'd with your main Stakes; and theſe ought to be at leaſt two Foot long, and drove down with Beetles and Sledges, with all the Force imaginable; for that theſe Stakes, once mov'd, will always put your Work into Diſorder, and make it unlevel; and there are ſo many Accidents that do, that you can't be too careful in the avoiding it.

I think I have gone thro' the moſt material Parts both in the Deſign and Execution of the rough-levelling Terrace-Walks under the main Body of the Houſe, in the Garden-Side, as alſo the Side-Terraces of a Lawn or Parterre; and it would be needleſs for me to repeat the Method of working, dreſſing, and carpetting them, in as much as it will fall in more properly in other Places.

Obſerva-

Observations on Fig. 4, *Plate* 26.

This fourth Figure properly relates to the Fencing of Gardens; which, as it has been of late done by a Terrace Walk in the Inside, and a Graff or Ditch in the Outside, may not be improperly tranſiently handled, tho' it be more fully in another Place.

As for the Method that has been us'd ſome Years ſince, in walling the Parterre with an high Wall, what can be more ridiculous, or expenſive? It may be alledg'd, theſe Walls are for Fruit; but theſe Fruit-Gardens ought to be detach'd from the Houſe, ſeparate and private; ſince by this Means no Body dare walk but the Owner himſelf, for Fear of loſing his Fruit; and that would be an Inconvenience but few generous Tempers would create, eſpecially in the Country, where Extent is requir'd. But, to reſume the Obſervation.

This, without Doubt, is the nobleſt Way of fencing in a Garden (next to Water, which can't always be had) but I have given Profiles of both, a Wall and Water; which, when well underſtood, will, I doubt not, be much more put in Practice than have yet been, ſince upon theſe Terraces it is that one may look either forward or backward, and view with Pleaſure the rude and diſtant Scenes of Nature, as well as the more elaborate Works of Art.

The Ditch, or Graff, on the Outside, being what supplies the Inside, and raises up the Terrace, was certainly a very good Thought, tho' I presume it has not been much practis'd by us in *England*, and was first deliver'd to us by a Gentleman, that is deservedly honour'd with some considerable Posts belonging to the Architectural Province, *&c.* in his Majesty's Works.

This Outside, from which we are supply'd with Earth to raise the Terrace-Walk in the Inside, is by the *French* call'd *la Fossé*, from the *Latin*, *Fossa*, a Pit; by the *Dutch*, *Graff*, and from them the same by us; and ought to be about 15 Foot wide at Bottom, five Foot deep, and the Slope 15 Foot horizontal, which is the Proportion allowable to sloping, as before directed.

The Wall is seven Foot and an half high, from the Top to the Bottom of the Graff, which is five Foot below the Plinth of the Terrace in the Inside; and two Foot and an half the Height of the Parapet-Wall, which is about Seat-high within, and gives one the Liberty of all the Beauty that Nature affords without. The Width of the Terrace may be about 12 or 15 Foot more; and wider than 20 Foot it need never be in the greatest Designs. The Profile points every Particular out so very plain, that I need not take any more Pains inwards.

Obserua-

Obſervation on Fig. 5, *Plate* 26.

This laſt Figure in this Plate is the Method of making a Terrace-Walk at the End of a Garden, or round the ſame, where Water can be had, and for fencing the Garden, Wilderneſs, *&c.*

And this is certainly the beautifulleſt of all Fences; and by digging the Canal, or Watercourſe, you throw up the Earth that makes the Fence. But this Terrace ought not to be too high; two Foot nine Inches, or three Foot, is full high enough, and two Foot and an half will do; but this ſhould likewiſe be detach'd from the End of all Walks, that the View may not be ſtopp'd into the Grounds adjacent; and this is alſo the Reaſon I would adviſe them not to be made too high.

Obſervation on Fig. 6, *Plate* 26.

The laſt we obſerve in this Plate, is the Plan of the grand Terrace we have already given the Profile of. It is (as is already obſerv'd) near 100 Foot wide; by which means the Building may be view'd with Eaſe and Pleaſure; and has, beſides, ſomething in it ſelf that looks grand.

For the Steps and Half-Pace coming out of the Houſe, project 15 Foot, 12 Foot whereof are allow'd for Gravel next the Houſe, and three Foot the Width of half the Verge of Graſs,

the Lines of Trees, on the Terrace, ranging in Line with the Pedeſtals at the Bottom of the Steps, which makes the Verge of Graſs, when it is at full Length, to be ſix Foot. This and the other Part of the Terrace is divided as follows:

Ten Foot Gravel next the Houſe, or Cockle-Shells.
Six Foot a Verge of Graſs.
Ten Foot, a Counter-Gravel-Walk, or Cockle-Shells.
Six Foot, another Verge of Graſs.
Three Foot of Sand, or Cockle Shells, between the Graſs and the Paving.
Forty five Foot, the Paving.
Three Foot of Sand, or Cockle-Shells, between the Paving and the Graſs.
Six Foot Graſs.
Ten Foot Gravel, or Cockle-Shells.
Six Foot Graſs.
Then comes the Slope.

Whether the Verges of Graſs before the Houſe be left plain, or planted with Pyramid Yews and Vaſa's between them, I leave to the Diſcretion of the Owner. I muſt confeſs there's a becoming Decency and Grandeur in plain Graſs only; and of that Kind is the large Terrace in *Buſhy* Park, belonging to the Right Honourable the late Earl of *Hallifax*, and ſeems much more proper in a Foreſt than elſewhere.

I have recommended Paving for the Middle Walk of this grand Terrace, it being very noble in its Kind; and, beſides, there are Times (eſpecially wet Weather) when Gravel-Walks are not fit to walk upon: In this Caſe Pavement is of mighty Advantage; but I only mention this *en paſſant*.

The Side-Walks are of fine Gravel; then three Foot next the Paving of Cockle-Shells; the Fall into the Parterre is, next, which, to avoid Expence, I would rather adviſe to be a Slope of Graſs, than a Wall, in the Middle of theſe Graſs Verges, except it be in the very Front of the Houſe. Let us ſuppoſe Elm-Trees for Shade, ſince the nobleſt Terrace, as well as any other Part of a Garden, is very deficient without it. And at the End, except the View be open and noble, one would adviſe a little Grove, with ſhady Arbours and Receſſes, at the End of which, on a Seat plac'd, the Owner may view the Grandeur of his Terrace, and have an oblique View likewiſe of two Fronts of his Building; but if it be an open View (which is ſeldom to be had at both Ends) then a Canal, Caſcade, or the Continuance of theſe Lines, will be a noble Termination. Theſe ſhady Elms I very much recommend, plac'd and detach'd (as they are deſign'd) from the Body and Wings of the Edifice. And the Want of this ſeems to me to be ſome Diſconut to the Beauty, as well as the Convenience of that noble Terrace I have in the Series of this Chapter mention'd. Surely

no Seat can be ſaid to be compleat, where there is not an immediate Shade, almoſt as ſoon as out of the Houſe. And the ſame may be ſaid of all other Side-Terracès, which ought by all Means to be planted with good Oak, or, which is of quicker and more regular Growth, Elm, rather than the more coſtly Yew and Holly, that muſt always be clipping, *&c.* beſides the other are, in Reality, of more Value, beſide the noble Umbrage that they afford the Owner. The Diſtance of theſe Elms a-croſs will be about 20 Foot, and they may be plac'd at 30 Foot aſunder in the Lines; the Quickneſs of their Growth, will, 'tis hop'd, ſoon gain Shade and Shelter to the weary'd and ſtudious.

Amongſt all that can be ſaid of the Beautifulneſs and Nobleneſs of Terrace-Walks, thoſe that are cut out of a natural Hill very much exceed all others, plac'd upon which we view the adjacent Country with the utmoſt Delight, and the Spirits are by an unaccountable Delight rais'd to the higheſt Pitch that Nature and ſublunary Proſpects can poſſibly advance them: For who is there that ever ſaw thoſe noble Elevations of *Belvoir*, *Nottingham*, *Burleigh on the Hill*, *Wincheſter*, and many other Places, would not think them appointed by Nature for the Reſidence of great and ſublime Spirits, and for the royal and moſt noble Perſonages of the World.

But

But, to quit this exalted Thought for a while, let us consider the best Method of cutting and dressing any Hill into Slopes. I have, I think, already, in the first Part of this Treatise, mention'd something of the Calculations that every Surveyor ought to make in the dressing and removing of unlevel Ground; and in this Chapter it will be more fully handled. Which that we may better do, we must have an immediate Recourse to the rough View of the natural Hill, in *Fig.* 1, *Plate* 27, and to the Scheme of the same Hill cut into Slopes, in *Fig.* 2 of the same Plate.

Observations on Fig. 1 *and* 2, *Plate* 27.

When you first begin dressing of a Hill, you ought by all means to take its Level from the Top to the Bottom (as will be more plainly shewn, when we come to take in the Level of Spring-Heads) and to draw on Paper the Hill, with its Bunches and Excrescencies; since 'tis by this that you must first conduct your self in the dividing it into Terraces; otherwise you may put the Owner to an immense unnecessary Charge, since it is not requir'd, that those Terraces that lye under one another, be of an equal Height or Width, but they should be govern'd and determin'd by the natural Line of the Hill.

In this Example I find the Perpendicular of the Hill is 49 Foot, and the Horizontal from the Perpendicular of the very Precipice of the Hill,

Hill, at A, at the Top, or, more properly, at the Bottom of the Perpendicular, at A to B, is 182 Foot.

Now, in order to take a general View of it in Numbers, we muſt examine what Proportion the Height of the Hill bears with the horizontal Baſe, ſince 'tis this that muſt determine whether you are to divide your Hills by Walls or by Slopes, or, which is a middle Way, by Walls and Slopes mix'd, *viz.* one Wall and Terrace, with a Slope between that Wall and the next, as you may ſee in Figure the 9th, Plate the 27th. In order then to eſtabliſh what I am going to lay down for our Direction in this Caſe, we ought never to make the Perpendicular of our Slopes above 15 Foot in the higheſt and moſt ſteep Hill; and the Baſe to that Perpendicular ought by no means to be leſs than twice the Perpendicular, *&c.* It will therefore follow from thence, that where-ever the Horizontal of a Hill be not above twice the Perpendicular, that there the Hill muſt of Neceſſity be ſupported by Terrace-Walls, or Terrace-Walls and Slopes mix'd together; but where it is more, that it may be done by Slopes, or by a a Wall and Slope, as has been already mention'd.

To put what we have been advancing into Practice, the Perpendicular of the Hill being 49 Foot, multiply this 49 by 2, and the Product is 98 Foot; and ſo much is requir'd for the Horizontal of all theſe Slopes. This

98

98 you must then subtract from the whole Horizontal of the Hill, which, as appears before, is 182 Foot.

See the Example.

49 the Perpendicular of the Hill,
multip. by 2 the allow'd Rule for the Base of
—— a Slope,
makes 98 as above:

182 The whole Horizontal of the Hill,
98 as above, being subtract. from it,

leaves 84 for the Flats of all your Terraces,

which divided by 3.) 84 (allows the Terrace to be 28 Foot wide, which is a very good Width; and from this Examen we find this Hill may be divided by Slopes, without a Wall; which is much cheaper, and, in Truth, more beautiful; but this Point I shall speak to more by and by.

After this preliminary Examination is over, we are to proceed in dividing the Hill into Slopes and Terrace-Walks; and, for the Advantage of the Work, we must cut three or four, and sometimes five, Foot, into the Hill, at the Top; because it gives some Advantage to the Hill it self, and the Earth is easily tumbled down to the Foot thereof, or to make good any Deficiency in the Middle or other Parts. This will readily inform us, that both in the designing and executing of this Work,

we

we ought to begin at the Top firſt, and ſo work downward; for this Reaſon, that the Earth is very eaſily tumbled down; on the contrary, one can't throw it upwards but with the greateſt Difficulty.

To go on then in our Work (which is ſomething difficult) you are to find whereabouts your hypothenuſal Line a b falls; which hypothenuſal Line being 35 Foot, you are to divide by 5, and multiply it by 2, and that gives you the Perpendicular of this Slope, and conſequently the Horizontal. See the ſame illuſtrated by Example.

The Length of the hypothenuſal Line, which the Gardener ought to have upon a Line, and to fix it diſcreetly in, ſo as to humour the Nature of the Hill, (and the ſame does by Compaſſes on the Paper) being 35 Foot. do as underneath, *viz.* divide by 5, as has been already taught;

5)35(7

the Quotient being 7, multiply it by 2, and that gives 14, which is the Perpendicular of the Slope, equal to 35, the given Hypothenuſe; and this, by Conſequence, makes the Horizontal to be 28 Foot, according to the leaſt Proportion we allow of the Horizontal to the Perpendicular of a Slope.

To do this upon the Ground, fix a dead Level at a, Fig. 2, Plate 4, as a c, which we ſuppoſe to be two Stakes, upon which we place

place our Boning Staves, before deſcrib'd, about four Foot and an half long; and at the End of the hypothenuſal Line, at B b, ſet up a 20 Foot Rod, and place it exactly upright, by holding a Maſon's Plumb-Rule to the Side thereof; and as you have already found, that your Perpendicular muſt be 14 Foot, you are therefore to tie a Piece of white Paper on your twenty-Foot Rod, at the Meaſure of 18 Foot and an half, (by which you allow 4 Foot and an half for the Length of your Boning Staff) and when the Paper is level with the Heads of your two Boning Staves, you may then conclude you are right; but you muſt obſerve one Thing, *viz.* when you apply your Hypothenuſal a b to your twenty-Foot Rod, and find you are to ſink two or three Foot deep into the Ground, you muſt be ſure to make an Allowance, elſe you will overrun your Hypothenuſal or Slope Line.

This Point being determin'd, it will be very eaſy to meaſure out, according to the Nature of your Hill, the Width of the next Flat, which, in my Deſign, is 37 Foot; from the Extremity of which you are to repeat the ſame Proceſs as you did in the other Slope, having in this Flat made a ſmall Allowance for the Hang of it, in order to the carrying off the Water, which Hang may be about an Inch in 10 Foot, or ſomething more; ſo that in this it may be about four Inches; and if it were 6 or 8, it would ſtill be the better, and would in ſome ſmall Meaſure help to take the great

great Depth of the Slopes; but this ſhould be carefully deducted out of every Perpendicular. For Inſtance, the Perpendiculars of the next Slope being 12 Foot, you ought to deduct theſe 6 Inches, (if you allow ſo much) and make it but 11 Foot 6 Inches, ſtill allowing 24 Foot for the Baſe of it; otherwiſe your Meaſures will not hit together at laſt.

The middle Line of Stakes, from Top to Bottom, being fix'd, we come now to the general Plan, and to the Care and Art that there is requir'd in ſtaking it out.

Obſervation on Fig. 3, *Plate* 27.

It appears, by the Scheme, to be an Imitation of Fortification, in which there ſeems to be little Occaſion to follow the exact Rules thereof, but to uſe it chiefly ſo, as that it may the moſt conduce to the Beauty and natural Form of the Hill. I need ſay little as to the reducing Fortification into Gardening; 'tis what will, I believe, be very pleaſing to all the martial Genius's of our Country; and it ſeems ſomewhat of Wonder, that it has not been made Uſe of before now. The firſt that was made Uſe of, of this Kind, was the *Ambit* of the Gardens at *Blenheim*; but that is after the ancient *Roman* Manner: I ſhall not, in this Place, inſiſt much thereon, leaving it 'til I come to the *Fencing in of Gardens*, where this Way of Fortification will come in very opportunely, and, I doubt not, be very agreeable

able to all such as love Improvements in Arts and Sciences.

At present let us observe, that a Hill thus regularly cut out, makes a kind of natural Perspective from the very Lines of the Plan: And, indeed, there is no Figure in all the Mathematicks, that suits the natural Beauty of an Hill so well, especially when it is a round one; but were it to be a Hill in Length, one would certainly, by cutting an Hollow in the Middle, make those Bastions at each Angle of an House, or any other Plan, at the Top of an Hill; for there seems to be something of a pleasing Air in the Breaking forward of those Angles, such, indeed, as few or no Geometrical Figures will allow of, because they splay off, according to the Rules of Fortification.

'Tis true, the Curtain or Flank Line, between the two Angles of the Hill or the Bastions, is longer than is allow'd in Fortification; but that is not much to our Purpose. The Breaks of the Angles (be their Distance what they will) the Exactness of the Slopes, as they lye one under another, and the general View of all is what, in this Case, is more to be preferr'd, than any exact Rules in the military Science, since 'tis not Use but Beauty that we strive here for.

Our Design being thus fix'd and resolv'd upon as to the Plan, and the middle Line being divided, as is before directed, you are to turn your Level length-ways of the Hill, at right Angles,

Angles; or, if it will suit with the Nature of the Hill the better, you may deviate from the great Exactitude of a right Angle, and may vary 6, 8, or 10 Degrees, without any Body's perceiving it. The chief Care should be in the first fixing of the Edifice, or any other material Line above the Hill, since these lower Slopes and Terraces ought by all Means to run parallel thereto, in Respect to Line as well as Level. And this is a great Fault, that is easily discernible in the Slopes of a noble Situation in the North Part of *England*, where the Slopes run neither parallel to the Line, nor are they parallel as to the Level of the Plinth, or, indeed, any of the Building; which makes them look twisted, awry, and not so agreeable as they would otherwise be.

To finish what we have begun, whether we fix our Slopes at right Angles, or whether we deviate either on the right or left, six, eight, or ten Degrees from the Rules already laid down, of carrying a dead Level a-cross the Head of a Garden, Terrace-Walks, *&c.* fix in Stakes at all the Angles of the Bastions; and being level, according to former Directions, there seems to remain nothing to do, but to proceed to working these Slopes, the Method of which will appear in the next several Figures.

Observa-

Observations on Fig. 5, 6, 7, *in Plate* 27.

You are to fix in the Stakes between the Angles of the Baſtions (firſt having the Stakes drove down very firm, ſo that no common Accident may move them out of their Places, or ſink them below, or raiſe them above, their Level) betwixt the firſt middle Line of Stakes and thoſe Angles, about 30 Foot aſunder, you are to put in Stakes for the forming your Slope, as in Fig. 7, Plate 27. Which Stakes being levell'd in, as is ſeen in the 5th Figure, you are to ſtrain the Line, as in the 7th, Diagonal-ways; thirty Foot is, indeed, full long to ſtrain a Line, but the Stake ought to be well fix'd in, and then, by a Twiſt, you may ſtrain the Line as tight as you will, the Line being made of the ſtrongeſt ſmall Cord, or large Twiſt; or, otherwiſe, you may ſet the Stakes in, at 15 Foot aſunder; but this is to deſcribe the Method in general.

You are to begin (as is before directed) at the Top of your Work, and are to cut the firſt Slope quite out of whole Ground, that the ſuperfluous Ground, that is par'd off, may be tumbled down, to make good any Deficiency that is underneath.

Multorum Manibus grande levatur Opus,

That Work grows light that many Hands employs:

is, in this Caſe, a very good Rule: For the Hill being all ſtak'd out, as faſt as a Bump is

taken off from one Place, 'tis receiv'd by Persons working in some Hollow near them, where they are at the same Time employing themselves in filling up and ramming those Hollows. And, indeed, the setting a great many Hands at Work together, is of great Use in this and most other Works.

In these Figures are therefore contain'd our *English* Method of levelling an Hill into Terrace-Walks and Slopes; how the same is to be particularly levell'd and lin'd out, and how the Stuff is to be mov'd, and where plac'd: By which Time we may suppose our Hill is brought to what we call a rough Level; let us now proceed to shew how they are to receive their finishing Stroke, how they are to be planted, *&c.*

The Hill being, as is before suppos'd, brought almost to a Level, the Workmen begin to strain their Line anew, and to take the Rake in Hand, in order to make good their Diagonal Lines; and that being done, the Quarters betwixt them, as are the Quarters a b c d e f, *&c.* the Work will begin to appear. And that the Lines may be the neater made out, in the carrying on this Work there ought to be a Reserve of the top and best Mold, to coat the Slopes with, and such reserv'd for the finishing, as will rake fine, either for the laying of Turf, or Sowing, which will come to be spoke of by-and-by.

I think the Method of levelling in the Stakes, straining the Lines, Raking, and Dressing,

Dreſſing, is, by what has been writ, and by the Figure on Plate the 27th, ſufficiently treated of. It now remains, that we ſpeak of Turfing, or ſowing with Hay; the latter will, by all, be allow'd to be the cheapeſt, tho' the firſt be the fineſt, and moſt immediately finiſh'd and in its Perfection.

But in large rural Deſigns, which is what the Subject of this Book is, and, to ſave Expence, I very much adviſe ſowing with Hay-Seed; except you have ſome Up-land-Turf that you can fleece off, that lies near at Hand, on any Common, or enclos'd Ground, that is intended to be plow'd; for by this you ſave a prodigious deal in Carriage.

1000 of Turf has formerly coſt 10 Shillings racing, cutting, and rolling; (every Turf being three Foot long, one Foot wide, and two Inches thick) but they are now cut cheaper; and I have computed, that the cutting and laying of a Rod of Turf, ſixteen Foot and an half Square, will coſt near 10 *d.* by which any Gentleman may eaſily reckon up his Charge, when he knows the Dimenſions of his Work.

Certainly, for about that Money, or far from *London*, at a cheaper Rate, 'tis poſſible for a Gentleman both to rake and turf his Terrace-Walks and Slopes; which amounts to about 6 or 7 *l. per* Acre, and which is no great Expence, and would encourage him however to turf all thoſe Parts that he is in

moſt Haſte of ſeeing in Perfection, and ſowing thoſe that lye fartheſt out of Sight.

The Sum of all, as to the Expence, is 2 *s.* or 2 *s.* 6 *d. per* Rod, at which Rate any Gentleman may level theſe Works, and rake and turf them, provided he goes not above one Foot deep in the excreſcential Parts of it, or does not raiſe it above one Foot deep in the Hollows, that is to ſay, in plain Terms, that can by his Care and Judgment ſo manage it, that what he takes off at one Place, may make good another, and not more; which requires ſome Judgment and Care in calculating, and is, indeed, a Province that very few arrive to any Proficiency in, without a conſiderable deal of Experience. 'Tis in this reſpect that many Gardeners run their Maſters to an infinite Expence to no Purpoſe, and make them pay ſoundly for the Neglect of good Advice.

All that I have to add more on this Matter, is, that I have made both the Steps and the Lines of high Trees, that ſtand upon the Tops of the Slopes, to ſplay off which I take to be abſolutely neceſſary in Works of this Kind, which by the Diminution of the viſual Rays are apt to contract the Viſta too much; and I ſhall finiſh this Chapter by adviſing, that whenever your Slopes be of a hot burning Gravel, or Sand, you carefully preſerve all your good Mold to line your Slopes with, to keep them from burning in the Summer-Time; and, if poſſible, you ſhould procure

procure ſome cool ſtrong Land, with which you may cover them three or four Inches, to great Advantage; but the firſt is eaſily procur'd.

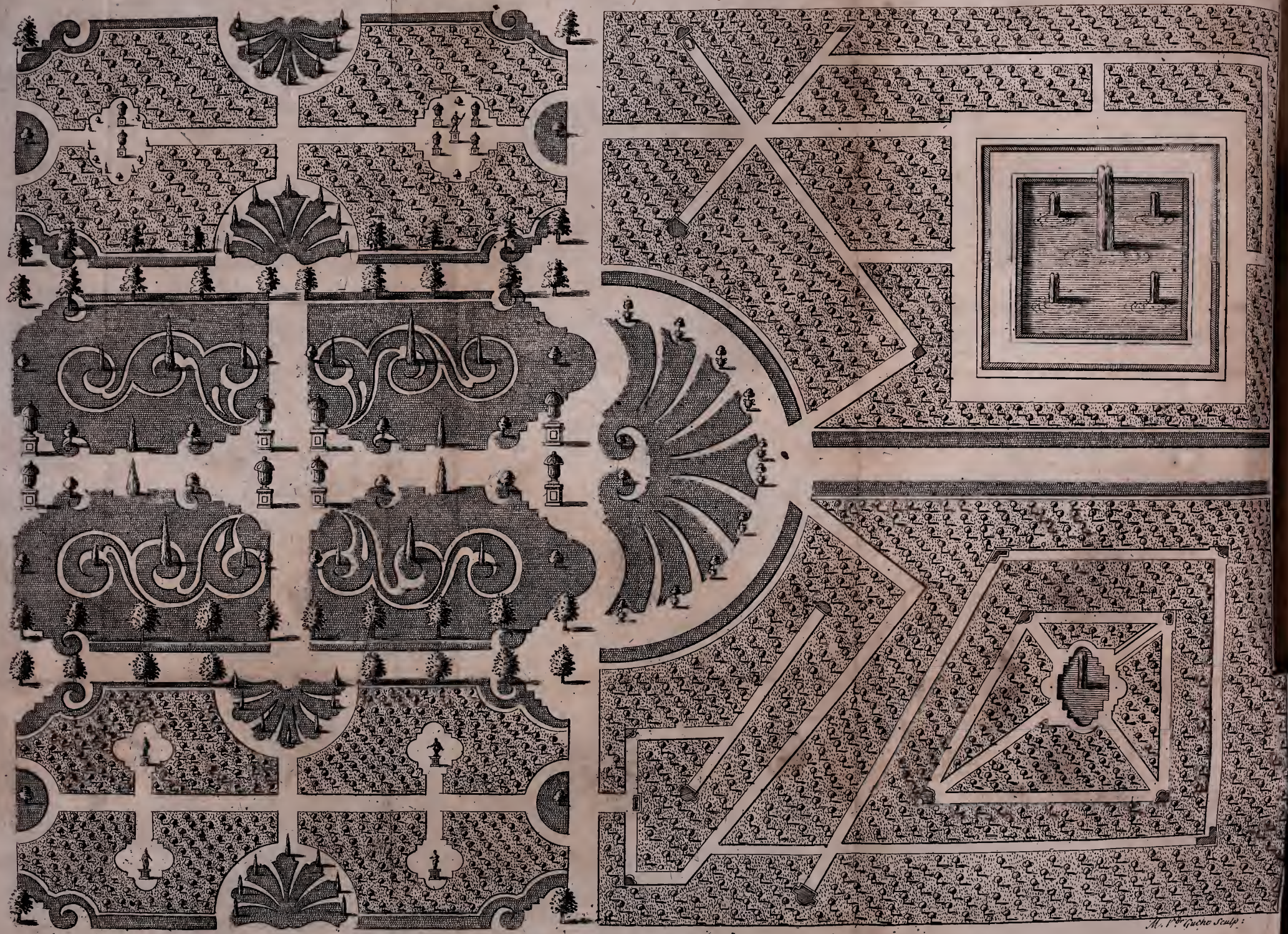
Obſervation on Fig. 9, Plate 27.

Figure the 9th contains the ſame Hill cut out into Terrace-Walks ſupported by Walls; and this truly looks very noble, but it is withal very expenſive, and is not ſo rural as Slopes of Graſs are.

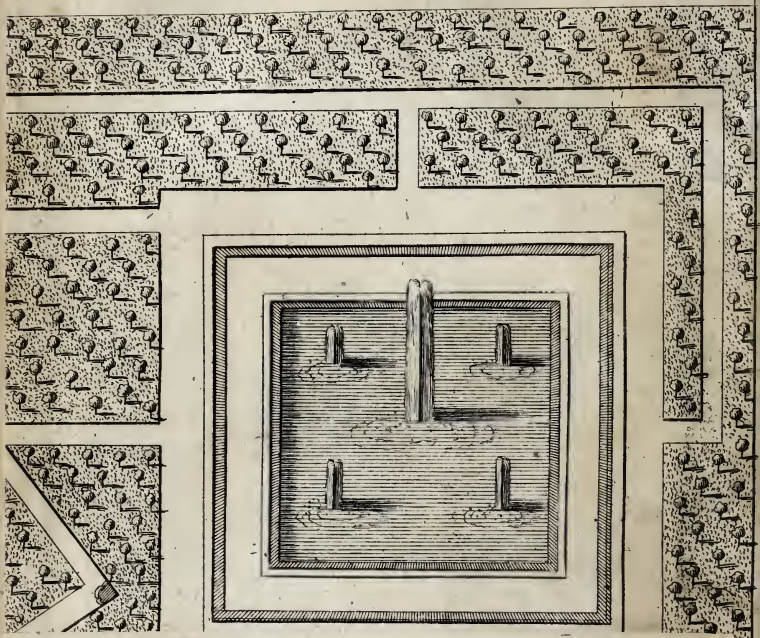
I know there are ſeveral Perſons fond of it, on the Account of the Walls for Fruit; but Experience ſhews, that the Trees being expos'd to the Bleakneſs of the Winds, (as of courſe they muſt in ſuch high Situations) are very much damag'd thereby. And to this we may add, that if the Ground be wet and cold, the Water ſoaks thro' the Wall upon the Roots of the Trees, and almoſt deſtroys them, and this eſpecially in Peach-Trees. This is of ſo ill a Conſequence, that I believe no Body, when they are appriz'd of it, will be fond of making thoſe Walls on the Account of Fruit, when it may be likewiſe objected that half a Wall is thereby loſt, ſince were the Owner to build Walls on level Ground, he may, in moſt Caſes, plant both Sides. And the Truth of the Matter is, the Trees that ſtand againſt thoſe Terrace-Walks, (eſpecially the Peach Trees) are moſt miſerably maul'd every Spring, at the Seat of a

Right Honourable Lord that I have had Occasion to mention already, notwithstanding all the Care imaginable has been taken to prevent it.

I need say little to demonstrate the Scheme, it is very plain in it self; but if any Gentleman does proceed this Way, he ought to have Pieces of Timber, with S's at the End, laid into the Terrace, to tye the Wall tight; tho' in large Stone it may do without. And that the Wall it self may butterise inward, in order to discharge the Weight the better, I would rather advise, that rough Stone or Brick, at the Back-side, be laid in Mortar, than dry; since one Way draws the Wet to the Face of the Wall, which the other in some Measure prevents.



M. P.r Ouche Sculp:



CHAP. VI.

OF THE

PARTERRE.

Parterre (ſays the Author of *The Theory and Practice of Gardening*, as he has it from the *Royal Dictionary*) is deriv'd from the *Latin* Word *partiri*. I ſhall not abſolutely determine againſt ſo great Authority; but it ſeems to have a nearer Relation to *Pars*, or rather the *Latin* Compound, *par* and *Terra*, a level, even Piece of Land; neither does it ſeem to imply any particular Decoration or Embelliſhment with which it is furniſh'd, and is therefore, by Miſtake, ſuppos'd purely to imply, in a limited Senſe only, that Diviſion or Plat of Ground, which with us (as well as in other Countries where Gardening is in Eſteem) is call'd the *Parterre*, or *Flower-Garden*; ſince the *French* have their *Parterre d' Eau*, or Par-

terre of Water, *&c.* And Parterres themſelves are divided into ſeveral Kinds, and have an Epithet join'd to them, to expreſs more fully their proper Diſtinction. But however general the Word is in its Conſtruction, 'tis what we underſtand here in *England*, by that level Diviſion of Ground that, generally ſpeaking, faces the South and beſt Front of an Houſe, furniſh'd, as it has always been with us, with Greens, Flowers, *&c.* Theſe the *French* (as already hinted) divide into ſeveral Kinds, as they are more or leſs, and according to the Manner they are ſet off and adorn'd, *viz.* Bowling-green or plain Parterres, the Method of which they own to have receiv'd from *England*, and Parterres of Embroidery, *&c.* The firſt of theſe Kinds is of the moſt Uſe, and is, above all, the beautifulleſt with us in *England*, on Account of the Goodneſs of our Turf, and that Decency and unaffected Simplicity which it affords to the Eye of the Beholder. Of theſe Kinds I have given ſome Deſigns, as alſo of others cut into Shell and Scroll-Work, with Sand-Alleys between them. And theſe are the fineſt Kinds of Parterre Works in Eſteem with us; and, indeed, were it not that Perſons differ in their Judgment of what is really valuable in each Kind, and in Compliance with that Cuſtom that has ſo long prevail'd, that any Author that publiſhes a Book of this Kind, would look ſingular, did he go farther; and were it not for this, I ſay, I ſhould have contented

tented my self to have given only the Dimensions and Proportion of a plain Parterre; but for this Reason I have, in the Plates at the End of this Chapter, given some Designs that have already been us'd, and very much approv'd of in *England*; and others, that, I may venture to say, are entirely new.

Of the general Proportion of Parterres.

But before we come to the Plates and their Description, it will be proper to say something as to the general Proportion of them, and their Shape. Sir *William Temple* has, long ago, observ'd, that an Oblong, or long Square, is the most proper Figure for a Parterre, because, by the *Rules of Perspective*, or the natural Declension of the visual Rays in Opticks, a long Square sinks almost to a Square; so, consequently, an exact Square appears much less than it when in a Plan, than in Reality it is; and that the Eye is covetous of Extent, and looking forward, is obvious to the meanest Observer.

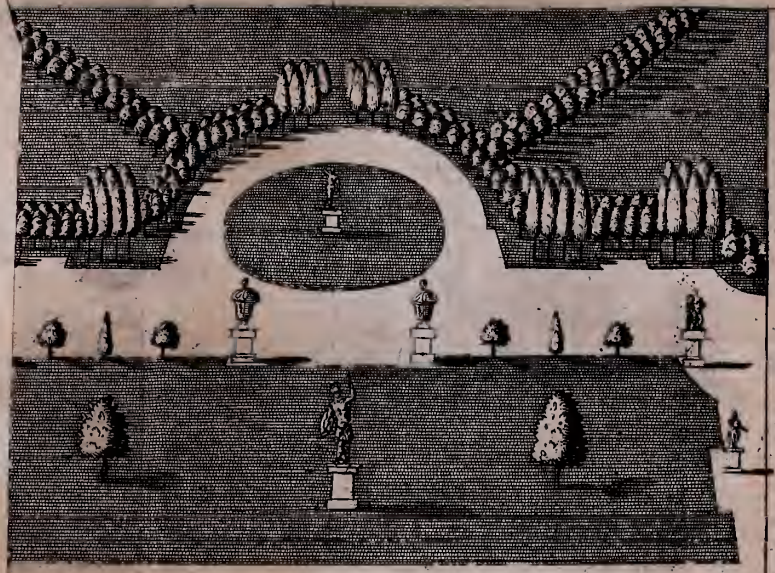
Of the Length.

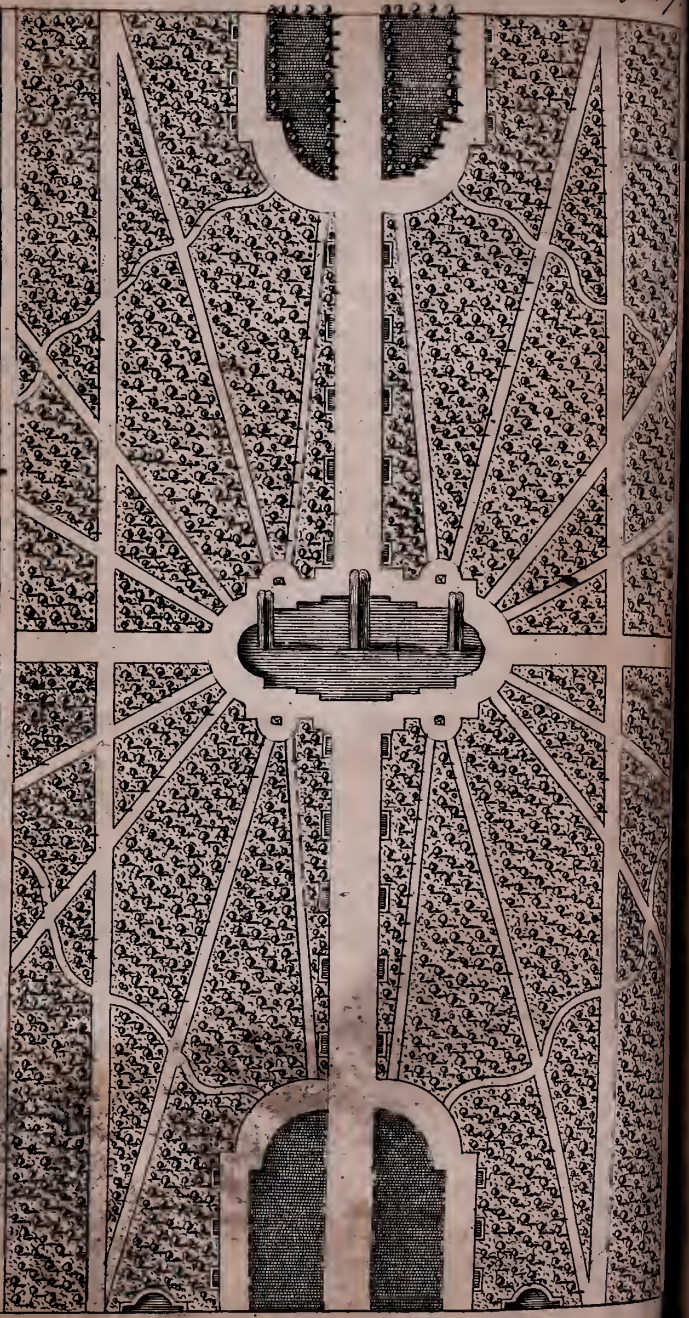
The Proportion that from these Observations we allow for the Length of a Parterre, ought not to be less than twice the Length, and is very seldom more than three times; and two times and an half is a very good Proportion.

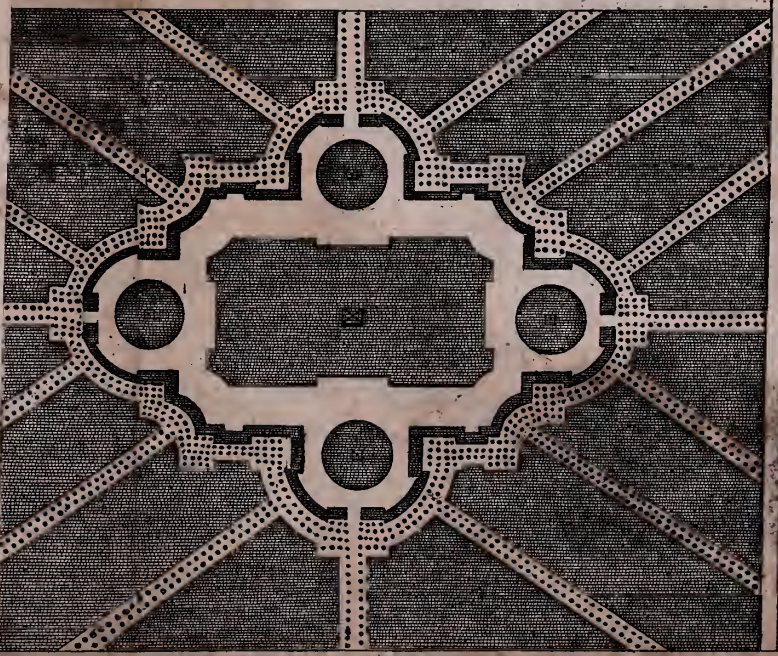
Of

Of the Breadth.

Parterres generally receive their Width from the Breadth of the Front of an Houſe; and where-ever the Houſe is above 200 Foot wide, we are oblig'd to follow it; but if the Houſe be not above an hundred Foot, or, ſometimes, leſs, it would be too narrow for a Parterre; and for that Reaſon an exact Meaſure ought, in this reſpect, to be fix'd; every Perſon is at Liberty to chuſe for himſelf; but, according to the Obſervations I have made on this Subject, Parterres are, generally ſpeaking, too large, by which Means the Expence of Gardening is not a little rais'd, and that which is the moſt valuable of any Part of a Garden, I mean Wood, and, conſequently, Shade, very much diminiſh'd. As one would therefore never make the Flat of a Parterre, betwixt Terrace-Walk and Terrace-Walk (which ought to be made on each Side, for an Elevation proper for View) above 300 Foot, or 100 Yards, ſo one can't, by any Means, make it leſs than 140 or 150 Foot; by which Means the Length, at two times and an half the Width, will be 350 Foot, or ſomething more, which is certainly a very handſome Proportion. I have been the more particular as to this Length of a Parterre, in as much as it is very often a Miſtake in Deſigners, to make their Parterre too wide, and, conſequently, they appear too ſhort; and in this







this Reſpect I think many of the *French* Deſigns (eſpecially thoſe that are in Mr. *James*'s Book) are very blameable; for, as nothing is more pleaſing to the Eye than a contracted regular Conduct and View, as ſoon as one goes out of an Houſe or Building; and a forward direct View (as has been already hinted at) is the beſt, be it either Parterre, Lawn, or any other open Space (double, treble, nay ſometimes, quadruple the Width) why may we not juſtly blame thoſe Deſigns that are much wider than they are long, and where, at our immediate Entrance into the Garden, the Nobleneſs of View is ſpoil'd, the Angles of Sight broke and confus'd, and, in ſhort, all that is valuable in Opticks made of no Account. Let this then ſuffice for a general Examen of the Proportion of Parterres; come we now to the Plates themſelves.

An Explanation of Plate the 28th.

The firſt Plate contains a Deſign that was a long Time ſince compos'd for a private Gentleman; but neither that nor any other Deſign is yet there perform'd; for which Reaſon I have given it without any Alteration. The Parterre is deſign'd for Graſs, Gravel, and Sand, or Cockle-ſhells interwoven one with another, and is (unleſs it was to be entirely plain) the neateſt and cheapeſt Way of making Parterres; beſides, it is always green, and Winter and Summer it maintains its natural

ral Verdure; the Expence of keeping is ſtill leſs than when there are Borders and Edgings mix'd therewith.

The Length is about 360 Foot, and the Breadth 180, which, indeed, is rather the ſhorteſt, but is what we were oblig'd to, thro' Fear of cutting away too much of the Wood that fronts the End of the Sweep.

As for the Wood, or Wilderneſs, I have but little to remark, only that Care be taken to avoid an Error too much run into by many Deſigners of Gardens, in making the two oppoſite Sides directly alike. This is, in Truth, the having only half a Garden; ſince wherever the Sides are equally the ſame, when one has ſeen and enjoy'd the one half, there is little Occaſion to view the ſame over again; but this proceeds from the Deluſiveneſs of a regular Draught on Paper. The large ſquare Baſin of Water was almoſt ready by Nature, it would therefore (in order to have made both Sides alike) have been the greateſt of Follies, to have been at the Expence of filling it up, ſince it is likewiſe in it ſelf the greateſt of natural Beauties and Conveniencies.

'Tis true, I can't agree with ſome, that would have, even in the Parterre, irregular and different Sides likewiſe; and I dare venture to lay it down as an Axiom in Gardening, *that whatever lies open to View, ought to be regular, while, nevertheleſs, whatever is within the Ambit of Wood, the more irregular, the more entertaining and diverting it is.*

The

The oppoſite Diviſion is of another Kind, and intended for a Kind of Labyrinth, ſomething of the Nature of that of *Verſeilles*; yet by no Means like ſome others, that are made of ſingle Hedges; for thoſe ſeem to be calculated for an inferior Claſs of People. Theſe are the moſt beautiful and moſt retir'd of all, and contrary to the Faſhion very common amongſt us of making their Wilderneſs open to all publick View; and to ſuch a Degree has this Fault been us'd, that in many Gardens of Note, 'tis hard to find (tho' the greateſt and moſt eſſential Requiſite in any Garden) ſo much as one private Walk; but the Owner, upon all Occaſions, is liable to the Noiſe and Impertinence of almoſt every Body. It is very proper that ſuch Diviſions as theſe ſhould be enclos'd, and a Palliſado-Gate fix'd at D, to keep it the more private.

At the End, and in the direct View of every Walk, fix'd in the Eſpalier Hedge, are deſign'd Statues, Urns, Paintings in Stone-Colour, Groteſque and antique Figures, Tables, *&c.* In fine, this, which by Meaſure amounts to no more than four Acres and an half (beſides the Kitchen Garden) is all that by any Means a Gentleman of conſiderable Fortune (tho' I ſhall not intend to limit any Body) would in Prudence make the interior Part of his Garden. The exterior, and more publick, will follow in a few Pages; and 'till then I reſerve what I have more to ſay on that Subject.

An

An Explanation of Plate the 29th.

I had once made a Reſolution not to have given any Deſigns of this Kind in Gardening, intending to have confin'd my ſelf to that ſimple, plain, and unaffected Method I have propos'd to my ſelf in the Delivery of what I have to ſay concerning Gardening; but as the Opinions, and, indeed, the more ſolid Judgments of Perſons, differ very much as to Deſign, I have (as before intimated) in Compliance with the Expectations of ſome curious Artiſts in this Way, given one Plate of that Kind.

And firſt, of Figures the 1ſt and 3d.

As to theſe firſt and third Figures, they are certainly the moſt eligible, by Reaſon of their Length, which, as I have before obſerv'd, is what is moſt valuable in a Parterre, ſomething near thoſe Schemes in the Parterre at *Hampton-Court*, next the Water-ſide; as is alſo that of *Blenheim*, and ſome others, that are accounted amongſt the beſt of their Kind; but in order to give them their full Length, 'tis neceſſary, at the Ends of thoſe Quarters, to add a Sweep or Break, to carry the Parterre to its proper Length; theſe Quarters ought likewiſe to be full 80 Foot wide, and of a proportionable Length, otherwiſe the Work in the Inſide would be much too thick.

Whether

Designs for Parterre Quarters.

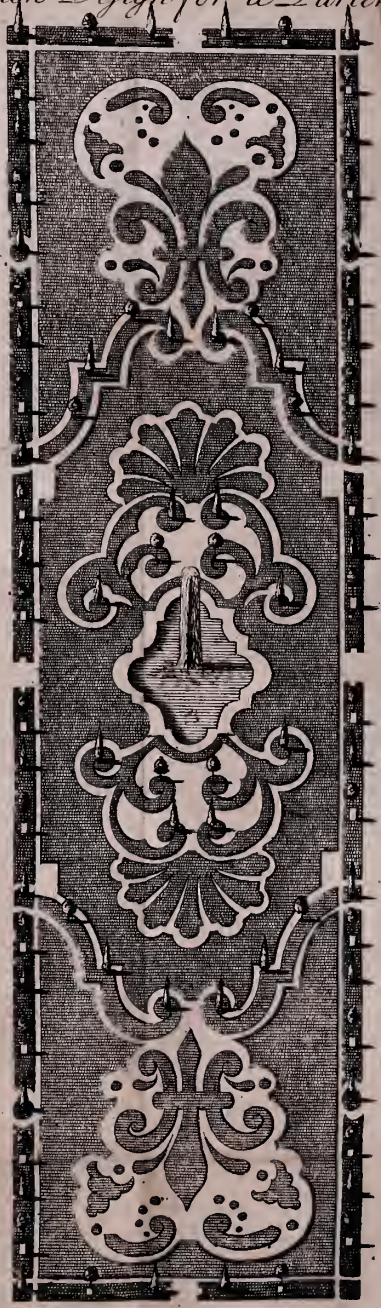
A Parterre in Shellwork & Grass.



A large Parterre Quarter with a Fountain in the middle, and the Quarters of Grass & Shellwork.



A new Design for a Parter



Pa

A larg[illegible]n for a Parter
middle,



Whether these Quarters are set off with Lead or Stone, Urns and Statues, or with Greens, as has been the prevailing Method; or whether the Borders should be of Grass or Earth, is left to the Choice of the Master; and to this Plate I need say but little more.

The 2d Figure, being entirely *Dutch* and *French*, I leave to the Choice and Refusal of all Designers.

Observation on Plate 30.

I have already mention'd (and both the Books, and other Accounts we have from *France*, shew) that the *French* have their Parterres of Water, as well as Grass and Embroidery; and it is, in Truth, some of the beautifullest Furnitures of the best Parterres.

This plain Design I drew some Years since, for a Gentleman that had a sloping Piece of Ground, that lay Side-ways of his House, which Slope is apt to spoil the direct View from any Building, and ought not to be admitted, especially in any main Front; for which Reason I thought it incumbent on me, to find out some Method to regulate this great Defect in Nature; and to that End, having a great Command of Water, I design'd this *Parterre d' Eau*, as the *French* term it; by which Invention the digging of the Basins would have plentifully supply'd the Terraces on the lower Side, and have made an handsome regular

gularly conducted View to the adjacent Country, which mightily deserv'd it.

In the great Terrace, upwards, there was a considerable Rise, that afforded an handsom Cascade; and on the lower Side, an Eminence, over a beautiful Meadow, which Meadow, with the neighbouring Village, and other pretty Landskips, might be view'd from the uppermost Terrace, on the lower Side of this Design, the Hedge being low, and the natural Slope of the Hill falling away quite down to it; whilst the Wood, that lies underneath, affords not a little Satisfaction, it being cut out into large Walks, that open at the Bottom to the aforesaid Meadow; but this I could not shew, by Reason the Scale would not allow.

The Plainness of the whole Design makes it appear, that it may be easily executed, the Slopes on one Side being entirely done to Hand, only cutting out of the Hill; whilst the other (tho' of more Expence) is as easily form'd, by Means of the Stuff that is dug out of the Basins.

The Trees, I propose on the Slopes, are no other than *English* Elm, under which, if the Owner desires, he may place Vasa's or Pyramid Yews; but I think it as well without.

The first Descent (as appears by the Design) is into a Level compos'd of plain Grass, and Statues; and the next is all of Water; round which if there were plac'd maritime Ornaments, the Effect would answer the Expence:

But the Design is entirely plain, and only a Grass Verge round the Water. The next Fall is a Basin, whereinto, upon Occasion, may be thrown a great Deluge of Water by a Cascade, out of that great Basin that is above; with several *Iet-d'Eau*'s, from a *Reservoir* at the Top of the Hill. The next Division is a Canal of 600 Foot long, which finishes the interior Part of the Design. The Height of the Terraces, and the Elm-Trees thereon, with the Length of the Canal, bounded, as it is, on each Side with Elms, must of Course make an handsome direct View, besides the Pleasure that those shady Terraces will afford in the extream Heat of Summer.

I can't, indeed, but think it a great Fault in many of our Gardens, that there is so little Shade, especially on Terraces, which are always left very naked, and planted on each Side with nothing but clipp'd Plants; whereas good Shade, and a lofty cool View, seems much more desirable. I know many will argue, that the falling of the Leaves in Autumn, will very much foul and spoil the Beauty of the Garden, and withal help to spoil the Water; but as this is but once in the Year, one ought, above all Things, to struggle with so small an Inconvenience, when so great a one is in the Ballance against it, I mean the five beautiful Summer-Months, and that during the Excess of Summer-Heats; when all that can be said on the other Hand,

can't poſſibly be put in any the leaſt Competition with it. But if any are ſo curious, there is now at *Brumpton* Park, a very great Stock of tall ſtandard Yews, that will retain their Leaves all Winter, and are, indeed, an immediate and beautiful Shade.

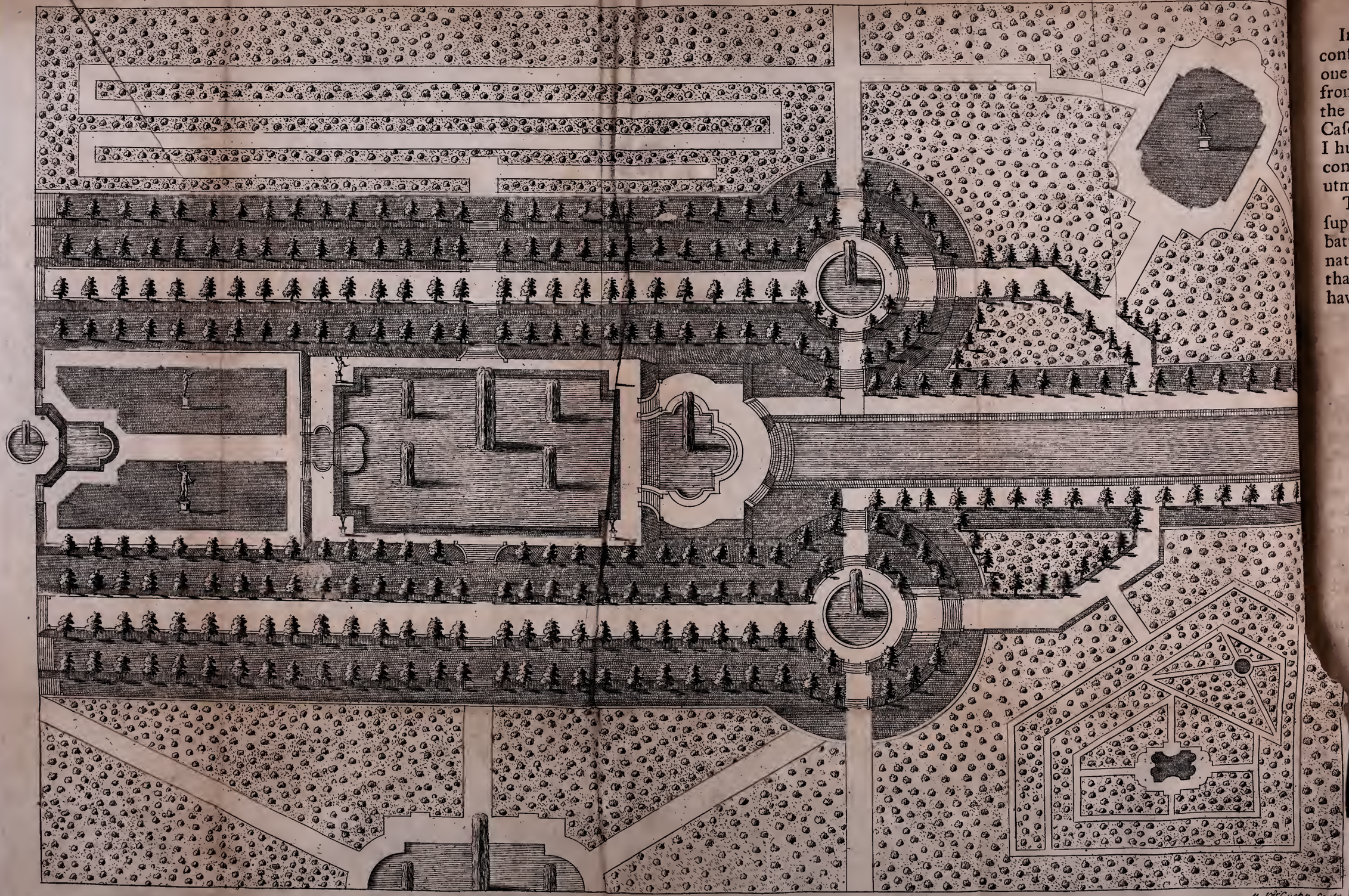
This cutting their tall Pyramid Yews into Statues, ſeems to have been one of the beſt Thoughts that has fall'n in the Way of Gardening for ſome Years. The noble Verdure and Shade that thoſe Yews make, c[illegible] but recommend them to the Choice of this, as well as the Umbrage of the lateſt Age.

As for the Wood on each Side, it is not very pertinent in this Place (being upon Parterres) to ſay much of it: The upper Side is cut into long private Walks, which, altho' they have not that Beauty upon Paper, that Figures in Wood have, are yet much more retir'd and private; the Want of which I take to be a very great Fault in moſt of our *Engliſh* Gardens; but this is already touch'd upon, and will more abundantly in the Sequel of this Book.

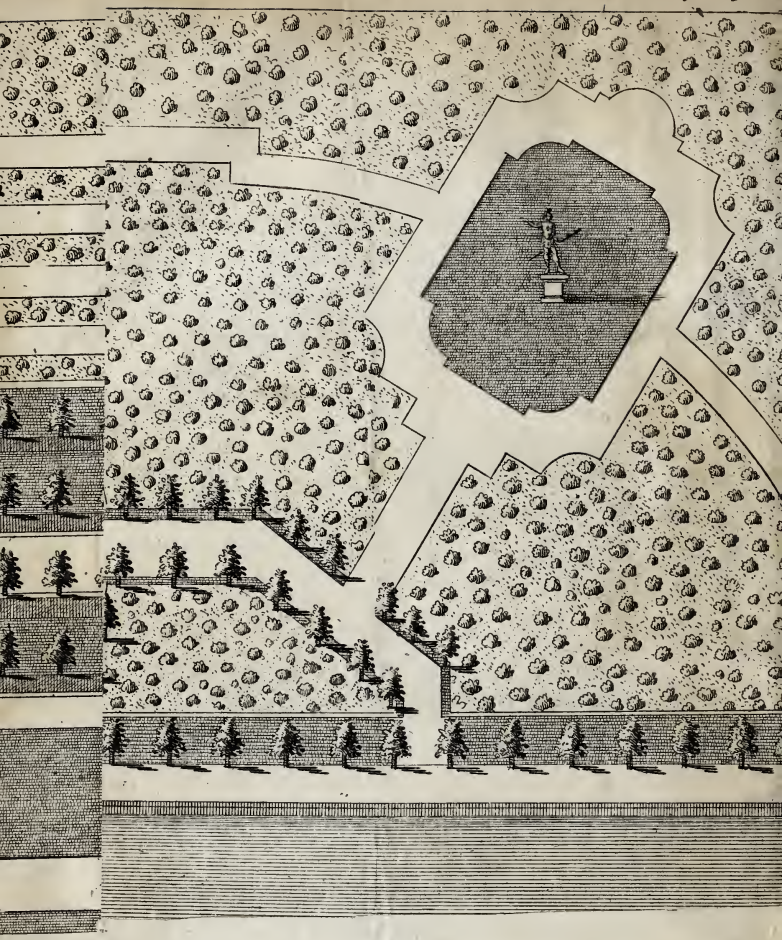
At the farther End is a large, open, riſing Lawn, and thereon a Statue, which will have no mean Effect, in reſpect to its being a riſing Hill, which ought to be plac'd amongſt the greateſt Beauties in Nature.

The oppoſite Diviſion, on the lower Side, is cut out into little narrow Walks, after a Labyrinth Manner.

In



M. Wrigley Sculp.



In fine, 'tis an eaſy cheap Deſign; and, conſidering the Beauty of the Terraces lying one above another, and the View, not only from the Houſe, but alſo at the Bottom of the Canal the Houſe it ſelf, and all the Caſcades of Water that fall from it, it may, I humbly preſume, be reckon'd amongſt the ſecond or third Rate Deſigns; which was the utmoſt of my Aim in compoſing it.

The Terrace-Walk at Letter A, is to be ſupported by a Wall, or the Earth may be batter'd away (as we call it) down into the natural Slope of the Hill, which will ſave that Expence; and with this I finiſh what I have to ſay as to Parterres.

Here follows the Deſign.



CHAP. VII.

Of Woods, Groves, Wildernesses, Parks, &c.

INTRODUCTION.

THE greateſt of all the natural Embelliſhments of our Country-Seats, being in Woods and Groves judiciouſly contriv'd and cut out, I ſhall make it my Endeavour, in this Chapter, to explain it, as much as in me lies: For, in Truth, amongſt all the Errors committed in Gardening, there is none greater than in this.

Tho' ſince all that pretend to Judgment in Gardening agree, that Variety is the greateſt and moſt diſtinguiſhing Characteriſtick in any Country-Seat or Garden, one would think it

no

no very hard Matter, to fix upon one and the ſame Method in deſigning of this beautiful Part of our Buſineſs: But I know not how it comes to paſs, People do differ, and that very much; and one ſeldom hears of two Perſons whoſe Opinions jump together in any Deſign, one will find Fault with what another eſteems excellent in its Kind.

I think it proper, in this Place, if it were poſſible, to endeavour to reconcile the different Opinions of Perſons in Gardening, and eſpecially as to Woods, the beautifulleſt Part of it. And the beſt and moſt general Rules that (in Words) I can poſſibly lay down, are to endeavour to follow and improve the Advantages of Nature, and not to ſtrain her beyond her due Bounds.

Some there are that eſteem nothing well in a Deſign, but long, large, wide, regular Ridings and Walks; and this, in Truth, is right in an open Park or Foreſt, where the Owner rides and hunts: But that a Garden-Deſign for walking in only, or if thereto we add Magnificence, which, I muſt own, thoſe long Ridings have, yet it would be a Fault to ſet too great a Value upon them in a Garden; and for the ſake of long level Walks, to level all thoſe little Eminencies and pleaſing Labyrinths of Nature: For tho' a few of theſe Walks are abſolutely neceſſary, in Reſpect to the Grandeur and general Beauty of a Situation, as the Middle and Side Walk, and a very few Diagonals, yet it is an unpardonable

Fault, as we see it almost every where, (let the Expence be what it will) to have scarce any Thing in a whole Design, but carries open Walks; so that be the Garden 40, 50, or 60 Acres, one shall scarce find any private or natural Turn in the whole; if the Wood be grown, down come all the noble Trees that stand in the Way of this Scheme. And this seems to be the greatest Difference in the Opinion of Persons as to Design. And that this is not Fiction, there are a great many Places do testify, particularly that beautiful Wood belonging to the Earl of *Carlisle*, at *Castle-Howard*, where Mr. *London* design'd a Star, which would have spoil'd the Wood; but that his Lordship's superlative Genius prevented it, and to the great Advancement of the Design, has given it that Labyrinth diverting Model we now see it; and it is, at this Time, a Proverb at that Place, *York against London*, in Allusion to the Design of a *Londoner*, and Mr. *London* the Designer.

But, to apply it more plainly to the Purpose in Hand, when you find a Wood that has a great many Hills and Dales, and is almost all of it compos'd of Irregularities, 'tis there one should not strain either the Fancy or the Purse, but follow those little Shelvings and natural Turns and Meanders. 'Tis there you should be regular in your Design; but whether the Level be up Hill or down Hill, whether the Turnings quick or more slow; or

or whether the Wood it self be thick or thin, one ought always to take the Advantage of it, and to make it most agreeable to the Nature of it, having always a particular Regard to large old Oaks, Beech, and such like Trees; in which Case one would as soon fire one's House, as cut them down, since 'tis the Works of so many Years, I may say Ages, to rear them again.

On the contrary, how common is it for Layers out of Gardens to resolve upon some regu- Scheme in the Closet, and from it to cut out their whole Design; so that down go all the Oaks, Beeches, *&c.* that have been some Ages coming to Perfection. And this, indeed, I foresee will be the Objection that will be made to some Designs that I have given; but I shall here explain when such Designs are proper to be us'd, and when not; so that I hope thereby to caution my Reader from falling into an Error on that Account.

When, therefore, we meet with a large Wood in an open Park, not near, or on the wrong (the North) Side of the House, and the same be a Level, particularly if the Wood be thick, and it does not destroy the general Prospect of it by so doing, 'tis there, in my Opinion, a regular Scheme ought to take Place.

But when the Wood is plac'd near the House, it is design'd chiefly for Walking, to be as private as is consistent with its own Na-

ture, as when it is naturally compos'd of ſeveral Levels, Hills, and Hollows. This is a Place deſign'd by Nature, for the Exerciſe of a good Genius in Gardening.

'Tis in large Hollows and low Grounds, and in the Middle or Center of Woods, that we make our little Cabinets and Gardens, of which ſome are to be found in this Book, and others may be taken out of Mr. *James*'s, beſides an infinite Variety that may be contriv'd; but the Lines extended from them ſhould not be carry'd out too far, for that will make one unavoidably ſplit upon the former Error of Regularity.

If Water is to be had, one ought to look for convenient Places to make Heads at (at as little Expence as poſſible) and to frame ſuch Figures as are moſt ſuitable to the Nature of that Hollow; ſo likewiſe of Hills.

If the Wood is thin, 'tis there one may clear it quite away, and make open Lawns. And if the Wood be an Eminence, then all the ſmall Stuff on the Outſide ought to be clear'd away, to open the diſtant Proſpect, if it deſerve it; but if it be an unſightly, barren Proſpect, then let the Wood remain to blind it.

Theſe, and ſuch like Particulars as theſe, ought every Deſigner to obſerve, and then the regular Deſigner will not be ſo much blam'd for his Regularity, in as much as it is an open level Park, is not plac'd near his Houſe, or is on the North Side, where Gardens and Walking-Places are not ſo abſolutely requir'd,

requir'd, but his Deſign is for an open ſpacious Wood, where the Owner is to ride, hunt, *&c.*

Neither will the natural Gardener be obſerv'd to have err'd, when he has fill'd all his little Eminencies and Hollows with little Gardens, Statues, and other rural Decorations; for his Wood is entirely for walking in; it lyes high, and he is not obſerv'd to have cut down any noble Trees, when, in Truth, the Nature of his Wood would not allow it; neither has he ſhewn himſelf fond of any Mathematical Figure, but has made his Deſign ſubmit to Nature, and not Nature to his Deſign. The Inſide of his Wood is fill'd with Hares, Pheaſants, the Statues of Rural and Sylvan Deities all cut out in Wood, while he contrives likewiſe that living Hares and Pheaſants ſhall abound; by which Means, beſides the couchant Furniture in Imitation, he has really a great deal that is alive and in Motion, darting themſelves a-croſs him where-ever he turns himſelf: He is often ſurpriz'd with little Gardens, with Caves, little natural Caſcades and Grotts of Water, with Pieces of Groteſque Painting, Seats, and Arbors of Honeyſuckles and Jeſſamine, and, in ſhort, with all the Varieties that Nature and Art can furniſh him with. But this is but a very imperfect Sketch of what a judicious Perſon may compoſe in this beautiful Wood.

Proceed we now to the deſigning and laying out of open, large, ſpacious Woods in Parks; and afterward to the other more retir'd and mere natural ones, deſign'd for Walking and ſolitary Amuſements, after we have remark'd ſome few Things as to the right placing or miſplacing of Wood; for this is too common an Error. I have touch'd ſomething of this elſewhere, but it likewiſe falls in properly enough here.

Of Wood miſplac'd.

Wood is miſplac'd, when it is too near the Eye in any Place, when it crowds ſo cloſe up to it, as to admit of no open Lawn or Breathing, if it may be ſo term'd; for, beſides that it ſtops the View too ſhort, it likewiſe thickens the Air, and makes the Situation unhealthy. It is likewiſe miſplac'd when it hinders the pleaſant Proſpect of any noble View; ſuch is the Sea, or diſtant blue Hills, or when near ones, and cloathed with Wood or fine Turf. Be a Wood, therefore, itſelf never ſo beautiful, it would almoſt tempt the Owner to cut it down, except he has any other Proſpects that exceed it. And if he ſhould build in the Middle of any thick Wood, or does intend to ſow or plant, he ought, at leaſt, to open an Avenue of 100 or 150 Foot wide that Way, while his natural Meanders ſhould be in Wood, as near as poſſible his Houſe. And in ſuch Places where the

the Wood does not hinder a better Prospect; this is supposing the Wood is upon a level Ground; but if it is upon a rising Hill, it ought not to be cut down by any Means, in as much as Nature has thrown that in the Way, to supply all the other Defects of the Situation.

In general, Wood on the South Side (if the Prospect be not extreamly fine) is not desirable near at Hand, as lying too contiguous and interwove with our Gardens; but should be clear'd away, and an open Lawn or Parterre made, detach'd of all the Angles of Building; 350 or 400 Foot at least from the Front of it in small Buildings, and 5, 6, 7, or 800 Foot in larger. In which, as we have observ'd in the Chapter concerning Parterres, the Width of the main Body of the Building (not the Wings) is our general Direction; wherein we should allow, at least, twice the Width of the Building, for the Distance of Wood from it, and, if possible, without cutting down too much Wood, two times and an half, or three times, tho' it come near up to the Outside Angles of the Edifice.

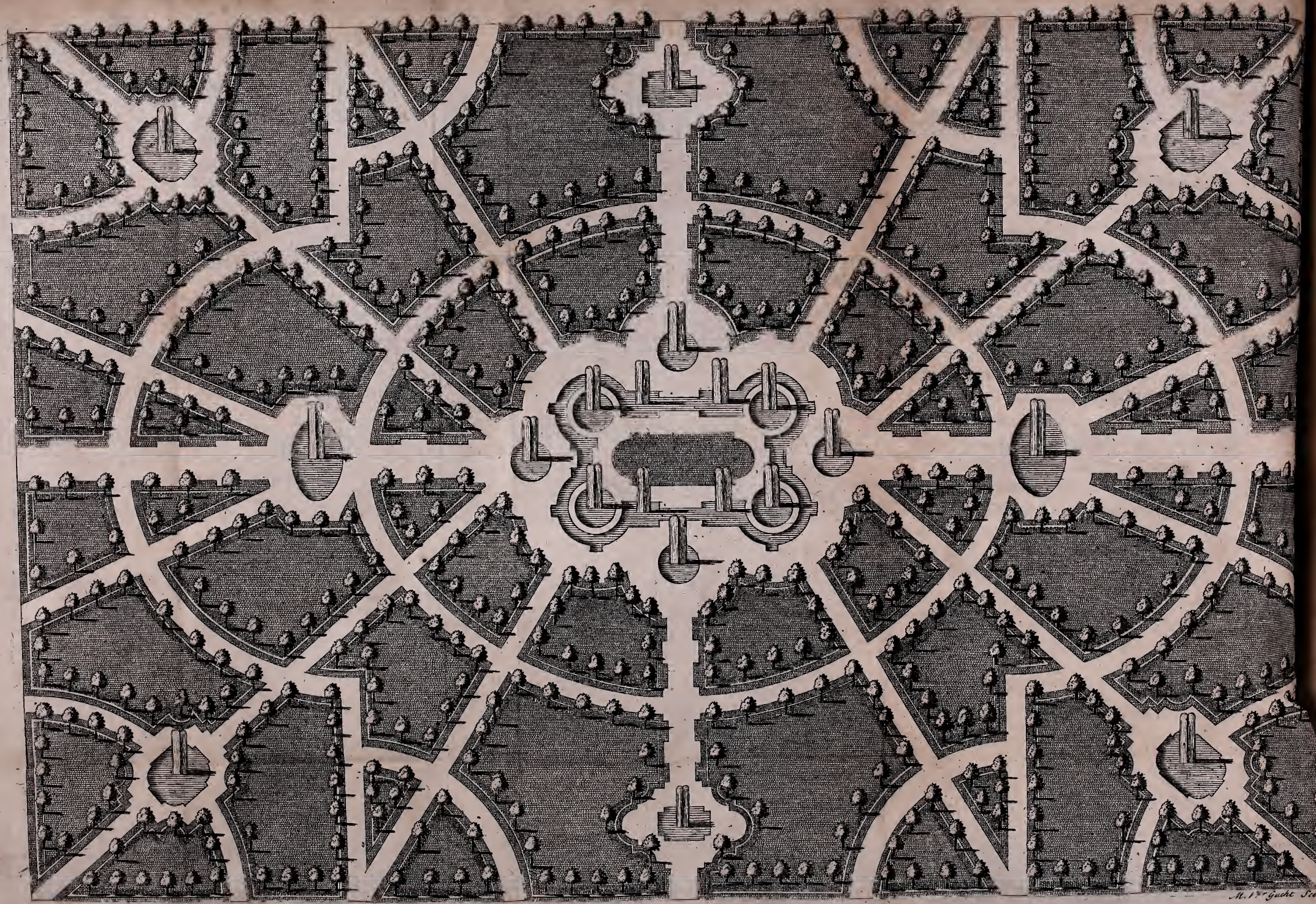
But as to the North Front, which is, generally speaking, the most champion View, there the opener and larger your Lawn is, 'tis still the nobler; and if the Wood is not already grown, a Lawn of at least a quarter of a Mile in Length ought to determine the View. For Wood plac'd at that Distance, or in larger Places six times the same, affords a most noble Termination to the View, as

may

may be ſeen in that incomparably beautiful Park of his Grace the Duke of *Ancaſter*, at *Grimſthorpe* in *Lincolnſhire*, and other Places. In fine, Wood plac'd at a Diſtance, and upon a Riſing, is, beſides its Uſe, one of the nobleſt and moſt pleaſing Views in Nature. But for the farther Illuſtration of this, I refer to the Chapter concerning Situations, and the Plate of the Diſtribution of Parks.

In the Interim, I can't but obſerve a great Fault in many of our Deſigns, in bringing our Avenues cloſe to the Court-Gate, by which Means we very often loſe the Beauty of a very noble Lawn, while the Walk would at the ſame Time anſwer its End at a great Diſtance, were it to begin a quarter of a Mile from the Houſe. Beſides, as I ſhall hereafter ſhew by a Scheme, Wood in this Caſe crowded up too near an Houſe blinds it; and I will affirm, as I ſhall by and by by Mathematical Demonſtration ſhew, that a Walk of an hundred Foot wide, if the Wood is not crowded too cloſe to the Building, will ſhew it as much or more than one of the full Width of the Building, ſuppoſing it two hundred Foot, where is a large open Lawn before it; and this will conſiderably ſave that Deſtruction of Wood which is very often on this Account made.

Obſerva-


M. 1st Gucht Sculp.

Observation on Plate 32, *Fig.* 1.

This Plate contains the Draught of an open Grove or Wood, cut out into Walks, with Fountains and Basins in it, and may serve for a little Park; for if it is on the North Side of the House, one can't turn it into any Thing more advantageous; since, in the first Place, the making is much cheaper than any strict Garden. And, indeed, I believe the World will allow it to be much more naturally beautiful and noble, than the most elaborate fine Garden; and, as for the keeping, 10 *l. per Ann.* in a Boy and Horse, a long Pole to cast about the Worm Casts and the Deers Buttons, with a Paddle to cut and root up any staring Weeds or Thistles, and a Bill fix'd in a Pole, to cut off such Boughs as are apt to grow in the Way will be sufficient; this 10 *l.* will do as much as 100 *l.* in the keeping of a very fine Garden, besides the Beauty and Nobleness there is in seeing of the Deer feed in the open Lawns, and running backward and forward through our whole Design. This Design I have lately compos'd for a Gentleman; and since 'tis not yet executed, I here place it, at the Front of my Designs of Wood-Work.

We have purposely design'd to clear away all the bushy Under-wood, in order to make the Grove the more open; besides, the Deer would break it in Pieces, and make it appear so ill, that one ought by all Means to take this

this Care, in order to prevent that Blemiſh; and it can't be deny'd, but that an open Grove is as beautiful as a cloſe one.

The natural Lawns in the Inſide, are likewiſe purpoſely clear, ſo that there the Deer may lye undiſturb'd, and have their Food ſweeten'd by the Sun and Air.

The Walks are moſt of them Graſs, which the Deer will keep cloſe as to the Mowing Part; and as to the rolling, ſweeping, *&c.* it is to be done by a Man, Boy, and an Horſe, I can't ſee but this whole Deſign, (which is near 30 Acres, and might in any ſuch like Caſe be two or three hundred) will appear as pleaſant as the fineſt Garden in the World.

It being ſo very plain and apparent in it ſelf, upon Paper, I ſhall not multiply Words to no Purpoſe in the farther Explanation thereof.

Obſervations on Fig. 2 *and* 3, *Plate* 32.

Figures the 2d and 3d in this Plate are the Plann and Elevation of a large open Lawn in the Middle of a Park or Wood bounded by Lines of planted Trees; but this ought to be above 1000 Foot long, and 800 Foot wide, by which Means it will appear the nobleſt Center that is in any Deſign that I ever ſaw, and deſerves a much larger Figure to expreſs its Beauty; but ſuch is our Misfortune, that 'tis very much to be doubted we have already ex-

excell'd the Strength of our Pockets in Plates, and there being a Neceſſity of having ſome more, we are oblig'd to contract our Sails as much as poſſible, leſt perhaps we fail in the Midſt of a too adventurous Flight. But to the Figure.

This little Attempt will ſhew, that the Plattoons at each Corner, are, by a natural Elevation, mounted up into Turrets, while the Inter-ſpaces are kept low, and appear like Piazza's, to convey one from one Turret to another.

This, I preſume, is altogether new in Planting, eſpecially as to the Elevation of the Turrets, which I ſhall therefore ſay ſomething the more of.

There are few Gentlemen, it is to be ſuppos'd, but what have ſome larger Elms and Lymes than ordinary to plant thoſe Plattoons with; and very uſeful in this Caſe are ſuch Avenues that are of 18 or 20 Years planting, where the Trees ſtand too thick, which is the Fault of almoſt all the Avenues that have been planted within theſe twenty or thirty Years laſt paſt; ſo that 'tis not only poſſible, but alſo very requiſite, that every other Tree ſhould be taken up; the Line it ſelf will be maintain'd every whit as well, and the Trees that remain will ſpread themſelves the better. This being granted, you are to take them up carefully, (as will appear in its proper Place) and prune the Head of the Trees, be it either Elm or Lyme, into a Conic Shape

Shape, and thoſe Snaggs or Boughs that are left, will throw out Branches in abundance, and will at once form a Kind of a Turret, while the Intervals of this, or any other Figure, may be planted with new Boughs, or lower Trees, and ſo kept low, by a little pruning, that the great Trees may form ſomething in the Nature of Towers, and the leſſer will appear, as intended, in the Nature of Corridores and Paſſages.

And this third Figure ſhews how much may be borrow'd, both of Terms and actual Directions in the deſigning and laying out Gardens, from military and civil Architecture. And 'twas from the firſt of theſe that the Ancients form'd their Rules in the planting and diſpoſing their Groves and Gardens, as may be learnt from *Virgil*, and other Authors. And of this Kind, 'tis certain, were the regular Plantations of the magnificent *Cyrus*, *Diocleſian*, *&c.* whoſe Memoirs have had a Place in the firſt Volume of this Work; to illuſtrate which, I ſhall give my Reader a particular Plate, if this Book ſwells not too faſt on my Hands.

The Plattoons at the Angles, and the Diſtance of all the Trees in the Intervals between Plattoon and Plattoon, may all be at twenty five Foot, tho' the Scale is ſo ſmall in this Figure, that no Certainty can be gather'd as to their Diſtance.

Obſerva-

Observations on Plate 32, *Fig.* 4.

This is the Figure of an open Lawn in a Park or Wood, to which, from six Centers, are brought eighteen Walks, besides the main Walk that runs thro', which, reckon'd from the Lawn it self, makes twenty.

There is little to be observ'd in these grand Centers and Lawns, but that they ought at all Times to be of a considerable Width; and this, in particular, ought not to be less than 250 Foot long, and if longer, the better, even 500 Foot; by which Means the Walks will be all considerably widen'd in Proportion. And 'tis also suppos'd, that this Design is for an open Park or Wood, that lies on the North Side of an House, upon a Flat, and for Ridings only; since, were it us'd for rising Hills and daly Ground, where there are but few large Trees, this Method would undoubtedly spoil the whole, and make it too publick for a private Walking-Garden, and level to the Ground those ancient Trees, which our Fore-fathers had all along preserv'd with much Care.

It must be observ'd, that there are several Niches in the middle Walk, to place Benches and Statues in; for these add very much to the Beauty, as well as Convenience of any Garden or Wood; and it cannot but be esteem'd a considerable Fault where-ever it is neglected. If there are any that will be at

the Trouble and Expence of placing more in other Walks, eſpecially in Centers, I can't but commend it; but this ſhould be not overlaviſhly, ſince 'tis eaſy to foreſee that a large Expence attends it.

I ſhall, in the next two Plates, give ſome particular Deſigns for Centers in little low-ſhrubb'd Wilderneſſes, that from ſome little Eminencies may be view'd with Eaſe: And then, after ſomething of regular Groves, ſhall come to what has been all along my chiefeſt Aim, *Natural and Rural Gardening*.

Obſervations on Plate 33.

We come now to regular Groves, Labyrinths, *&c.* which have likewiſe their particular Beauty, as indeed this will, upon a few Conſiderations, appear to have.

The Center is compos'd of a neat Graſs-Plat, encompaſs'd round with Feſtins and *Jet-d'-Eau*'s, or Falls of Water; which muſt have a very good Effect, as it will appear every where thro' and under the Trees, eſpecially at the Ends of the Walks, and in the Paſſages thereof up to the Center.

It may be obſerv'd, that under the Standard Trees I have deſign'd Hedges; which Hedges are to be of Eugh, or, rather, *Swediſh* Juniper, kept cut to about two Foot high; and the Standards, which I ſuppoſe to be moſt of them Eughs, (in as much as they are not

ſo

ſo apt to foul the Walk:) And if the Planter pleaſes, he may, between every one of them, plant little ſtrip'd Standard-Hollies, about three Foot and an half in Stem; and theſe will look very bright amongſt the Dock-Eughs, and very much diverſify the general Eughs; but this I could not expreſs here, the Scale being of the ſmalleſt.

The Inſides are to be all Graſs-Works; whether plain or cut, I leave to the Opinion of the ingenious Gardener; but be it which it will, it can't but look well. And the Niches in the Verge, on the middle and croſs Walk, are to ſet Benches on, detach'd and clear of the Gravel; or may otherwiſe be left plain: Tho', if we would mix the *Utile* with the *Dulce*, the Quarters may be ſtock'd with ſuch Sorts of Kitchen-Stuff as are not offenſive, as are Cabbages, *&c.* for Peaſe, Beans, Artichokes, *&c.* being kept clean, will look as well as any Thing, and pay for their keeping.

The full of this Plate is, then, an open Grove, with regular Walks, *&c.* which, as they will certainly make an agreeable Confuſion, and an imperceptible Regularity, may be admitted into the beſt of our Gardens and Woods; and they have this above common Wilderneſſes, that they are more airy and light, and are ſtill as ſhady as any others.

This Design may also be turn'd to a regular Wilderness, or a promiscuous open Grove, as well as this (as may some of the others I have given) which will, I hope, make them the more acceptable.

Observations on Plate 34, *Fig.* 1, 2.

'Tis certain, that the Quadrate and Quincuncial Manner of planting and ranging Trees, is the most ancient, since it is confirm'd from *Abydenus*, *Eusebius*, and others, that *that* was the Form of the *Hanging Gardens* of *Babylon*, as describ'd by *Q. Curtius*; and in the memorable Garden of *Alcinous*, anciently conceiv'd (as Sir *Thomas Brown* words it) an *Original Fancy from Paradise*, there is Mention made of well-contriv'd Order. *Diomedes*, (as the same Author quotes him) describing the rural Possessions of his Father, gives an Account, in the same Language, of Trees orderly planted; and *Ulysses*, being a Boy, was promis'd by his Father forty Fig-Trees, and fifty Rows of Vines producing all Kinds of Grapes.

The Author of the *Theory and Practice of Gardening*, has, in his excellent Book translated by Mr. *James*, given us a Specimen of what he calls Planting in *Quincunce*, in which he is in this mistaken; because, in his Design, the Trees are all planted square, or at Right Angles, when, in Truth, the Quincuncial Disposition of Trees, is

is alternate, like a Figure of 5, as it is Engliſh'd from *Cicero*; and ſo three Trees form thereby an equilateral, or ſometimes an equicrural Triangle; four Trees, a *Rhombus*, or Lozenge; and five, a Figure of 10. But, to finiſh our Obſervation on this Author's Miſtake, and go on: This Method was not only in Uſe in planting of Trees, but alſo in many other Arts and Sciences, and eſpecially *Military Diſcipline*, and was, perhaps, by them brought into Planting therefrom:

Thus *Virgil*:

Sic tumulis acclive ſolum colleſque ſupinos
Indulge ordinibus, nec ſeciùs omnis in unguem,
Arboribus poſitis ſecto via limine quadrat,
Ut ſæpe ingenti Bello cum longa Cohortes
Explicuit Legio, & campo ſtetit Agmen aperto,
Directæq; acies, ac latè fluctuat omnis, &c.

By which handſom Deſcription of *Virgil*, we find this Quincuncial Method to have its Original from the Methods obſerv'd by the Generals of the Antients in ranging their Armies. The Rhombus, or Lozenge Figure, was a remarkable Form of Battle in the *Grecian* Cavalry, obſerv'd by the *Pallians*, and *Philip* King of *Macedon*, and frequently by the *Parthians*; and the *Roman* Battalia was order'd after the ſame Manner; for thus the *Haſtati*, *Principes*, and *Triarii*, were plac'd in their Bodies, and in theſe conſiſted the main

Strength of the *Roman* Battle; from which, and from innumerable other Conſiderations, the ingenious Sir *Thomas Brown*, in his well-known elaborate Eſſay on the Gardens of *Cyprus*, has eſtabliſh'd this Quincuncial Method. And *Julius Cæſar*, in his Approaches to the ſtrong Town of *Aliſe*, in his Lines of Circumvallation, fix'd in Stakes up to the Head, after this Manner, in order to baffle the *Gauls* in their Aſſaults; as we learn from his *Commentaries*.

And the ancient Authors, *Varro*, *Quintilian*, and the aforemention'd *Q. Curtius*, recommend it as highly beautiful; but *Virgil*, in particular, recommends it for its Uſe too:

Non animum modo uti paſcat proſpectus inanem,
Sed quia non aliter vires dabit omnibus aquas
Terra, neque in vacuum poterunt ſe extendere rami. Virg. Georg. 2.

But we may obſerve, that the Advantage of this Quincuncial Method is ſo much beyond the Quadrate, that an Acre of Ground, where they are planted at equal Diſtances in the Rows, this Way, will have at leaſt a fifth Part of the Number of Trees more than the other, and that by Means of their alternate Diſpoſition. And this is particularly a very good Way in planting of an Orchard, or any other Plantation, where the Planters would diſpoſe of as many Trees as they can.

To come then to our Method of dividing our Plantation after this Quincuncial and Quadrate Manner, on which the afore-mention'd ingenious Author, Sir *Thomas Brown*, has ſpent about 100 Pages. When the Width of a Piece of Ground is taken, you are firſt to ſquare it out exactly by the Method heretofore deliver'd, in the *Mathematical Inſtructions for Gardeners:* Which done, and four Stakes ſet, one at each Angle of your Work, divide it by an uneven Number, ſuch as you think will divide the Rows of Trees at fifteen, twenty, or twenty five Foot Diſtance, more or leſs, as the Occaſion requires. As for Inſtance, in the 2d Figure of this next Plate, the Diſtance from Corner-Tree to Corner-Tree is 306 Foot, which, by Way of Eſſay, I divide by the uneven Number of 17, which gives 18 in the Quotient; and that 18 is the Number of Trees in that Line, at 17 Foot Diſtance. And the Reaſon that I divide by this or any other uneven Number, is, that thereby the Trees range every Way, which, if they were divided by an even Number, they would not do. But this is chiefly uſeful in Avenues, or where there are large Walks that paſs through one of theſe Plantations, in which, if you do not take this Method, the Trees will not range. But in regular Avenues, where Ranging is requir'd, it being, indeed, the very Principal requiſite in theſe Kind of Works, it is very neceſſary, as will hereafter appear,

when we come to ſpeak of *Parks* and *Avenues*. But now to purſue the Thread of our Inſtructions.

In this Caſe the Planter ſhould therefore chooſe ſuch a Number for his Diſtance as the Nature of his Tree requires: If it be for Dwarf-Fruit, 13 Foot will do; if Standard-Fruit, 17, 19, or 21, and, ſometimes, in rank-good Ground 25 Foot; but, if it be for Foreſt-Trees, which is at preſent our ſuppos'd Caſe, (tho' the general Scale does not admit it) then they ought to be at leaſt 27, 29, or ſometimes 31 Foot; and, by this Means, if you ſquare out your Ground exactly, and plant the outer Rows firſt, all the reſt will range quite thro' your Deſign.

And if it be an Avenue, or there are Walks paſſing thro' it, you muſt always make the middle Width exactly two, three, or four Times the Width of the common Diſtance of your Trees: Thus, for Example, if your Trees are at 31 Foot Diſtance, your Walk, if it be about 100 Foot in the Deſign, muſt be reduc'd to 93 Foot, which is three times the common Diſtance of your Trees; and then let your Avenue be wider or narrower, or the Ground be near a Level, your Trees will range every Way. In order to this, you ought to be very exact in ſquaring and meaſuring out your Diſtances, or you'll be puzzled.

When you plant, therefore, in the Quincuncial Manner, as in the 1ſt Figure of the next Plate, you are to allow about 25 Foot aſunder

ſunder in the main, 15, 17, or 19, for Dwarf Fruit, and 35 Foot at leaſt for Foreſt-Trees; becauſe it is requir'd ſo to be by the Largeneſs of their Growth more than Foreſt-Trees. And by this Quincuncial Diſtribution of them, becauſe, even by this Means, tho' the Diviſions on this Figure are larger than the other, yet does one hold near twenty Trees more than the other, and alſo the Trees have all neceſſary Room; which makes evident what I have before aſſerted, that this Quincuncial Way is the beſt, in as much as it holds more Trees than the ſquare Way does. Yet it muſt be obſerv'd, that when any Perſon goes to ſet out one of theſe Quincuncial Plantations, he will have Occaſion to uſe double the Number of Stakes, that he does in the Quadrate, that ſo he may range them in alternately, and make a Figure of V, with three Trees, quite thro' his Plantation, *&c.*

After the whole is thus figur'd out on the Paper, or actually planted on the Ground, 'tis then the Croſs-Walks, or let them be direct, or, indeed, any other, that the Figure beſt admits; but it muſt be noted, that in all direct Walks, the middle Line of Trees, or ſometimes two or three Lines, muſt be left out, both to give the Walk its proper Width, as alſo that the Trees on each Side may be directly oppoſite, which they would not otherwiſe be. But in all Diagonal Walks the Quincuncial Method is beſt, being by the alternate Diſpoſition of the Trees both

parallel

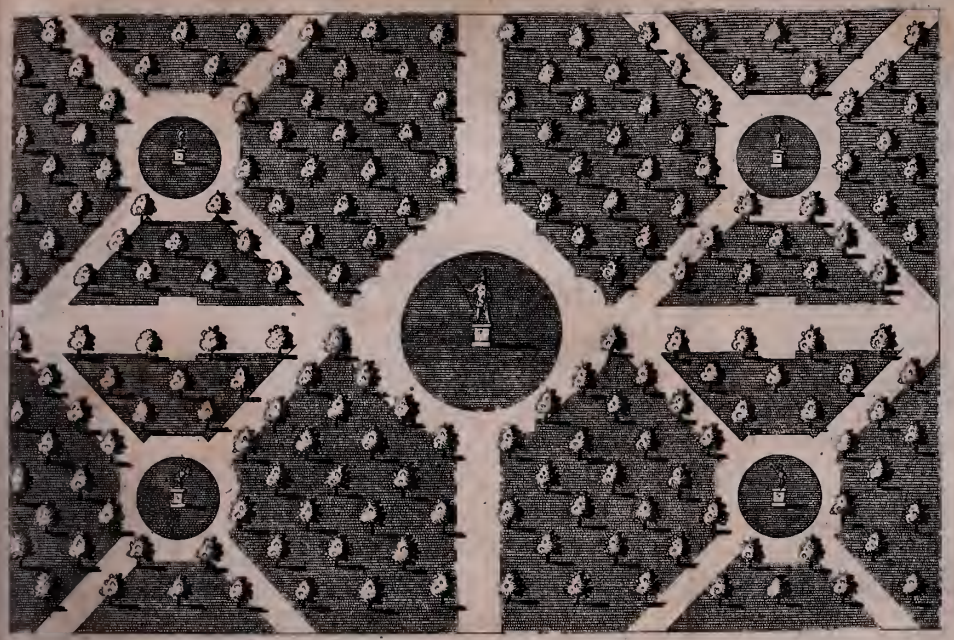
parallel and oppoſite, as may be eaſily obſerv'd by viewing the Figure it ſelf, Numb. 1, in the next Plate.

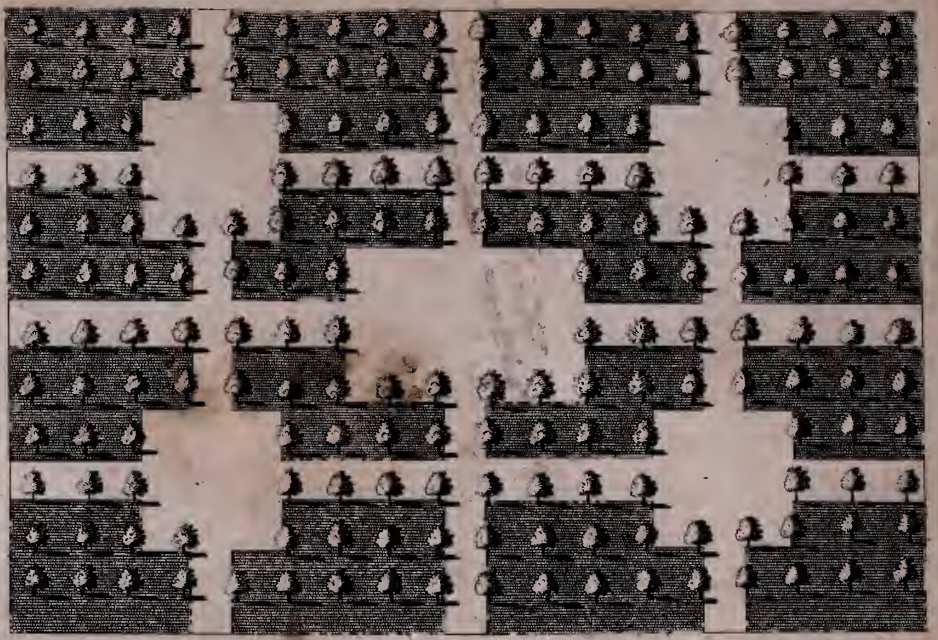
It will not be requir'd I ſhould in this Place lay down the Method of Planting it ſelf, that having been already hinted at, and will in all its Parts (I hope) evidently appear in the Sequel of theſe Endeavours I am making to oblige the Planting World.

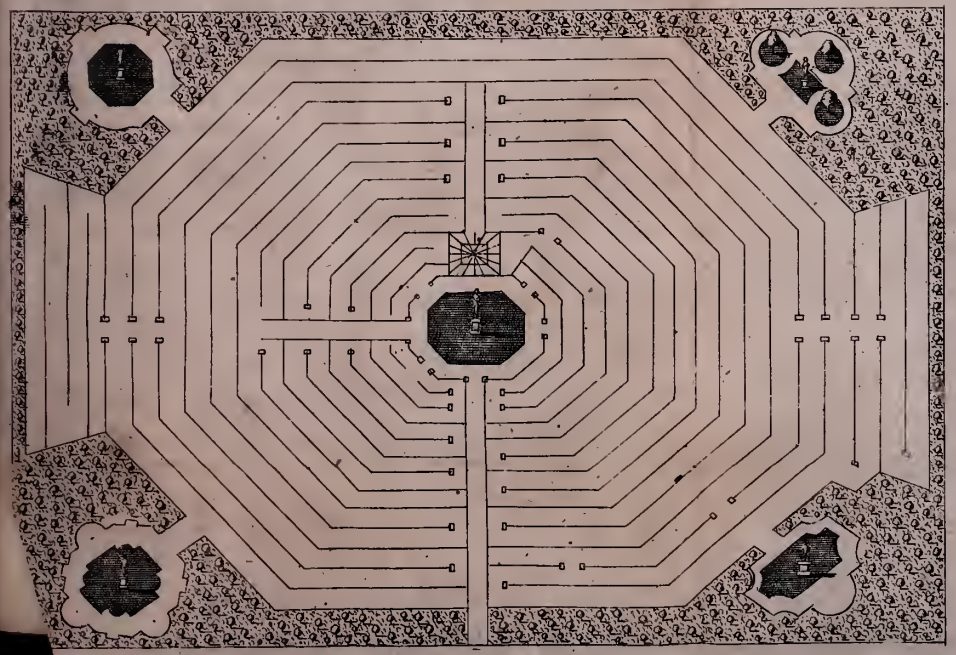
Proceed we then, in the next Place, to the third and fourth Figures in the next Plate.

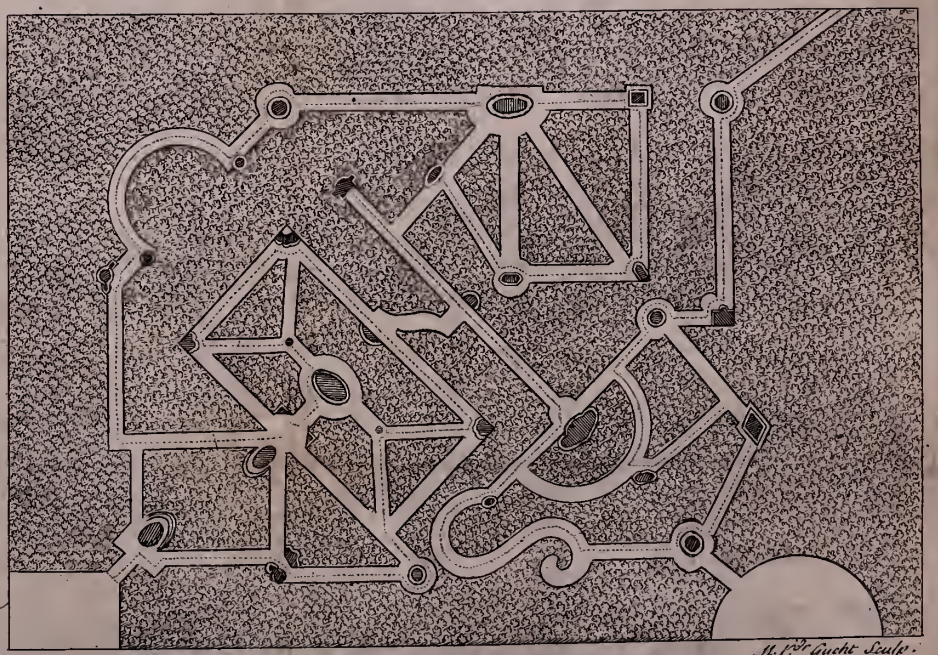
Obſervations on Fig. 3, 4, *Plate* 34, *concerning Labyrinths.*

It will be needleſs, in this Place, to examine much into the Etymological Derivation of this Part of Gardening, or of its Antiquity, it being well known to ſignify a winding, mazy, and intricate Turning to and fro, thro' a Wood or Wilderneſs. This is what the Antients took particular Delight in; and the Poets choſe them for ſome of the pleaſanteſt Themes of their Works But, to quit this, we may obſerve, that thoſe that have been of late made in *England*, and, indeed, ſome old Deſigns we have in ſeveral Parts, and in ſeveral ancient Books publiſh'd in our own Tongue, have been all of ſingle Hedges. And, by the Way, we may likewiſe obſerve, that this Part was, and has always been, one of the firſt Steps made in Gardening, in moſt Coun-









M. P.r Gucht Sculp.

Countries, particularly in our own: And we may obſerve to have ſeen very intricate Labyrinths in our old Books of Gardening, when at the ſame Time the other Deſigns in Gardening were altogether mean and inſignificant.

The third Plate is a Labyrinth of ſingle Hedges, or Banks, after the ancient Manner, tho' not altogether of the ſame Figure; for when I come to conſider the Uſe and Nature of a Labyrinth, according to all the Conſtructions that have ever been made of it, *viz.* That 'tis an intricate and difficult Labour to find out the Center, and to be (as the Vulgar commonly like it for) ſo intricate, as to loſe ones ſelf therein, and to meet with as great a Number of Stops therein and Diſappointments as poſſible; I thought the only way to accompliſh it, was to make a dubious Choice of which Way to take at the very Entrance and Beginning it ſelf, in order to find out the Center, at which we are to end at B, into a little Arbour cradled over; for which Reaſon there is, in the very firſt coming in, in the Center, where the Graſs-Plat and Statue are deſign'd, at A, ſix different Entrances, whereof there is but one that leads to the Center, and that is attended with ſome Difficulties, and a great many Stops.

The moſt that ever I obſerv'd in this Caſe, are at *Hampton-Court*, where, I take it, there are but three or four falſe Stops, or Methods to loſe or perplex the Rambler in his going

in;

in; whereas in this there is above twenty, and I presume to say, (if it were of much Value when I had so said) that 'tis not a very easy Matter to find this Center, without the Draught or perhaps with it. But, be it as it will, it is of no great Use to enlarge upon it, after the Design is thus fix'd; and in the large Quarters and Division of a Wood, this may give some Light in the making them intricate and perplexing, and may help to accomplish our Garden-Amusements.

The fourth Figure is the Draught of the Labyrinth at *Versailles*, which is allow'd by all to be the noblest of its Kind in the World, and which I here place, to give my Countrymen the Taste of the *French* in Labyrinths; and because this Draught may not by any other Means fall into the Hands of many of my Profession, I have given it as it is there us'd; and I may venture to say, that it is the only one that I have not compos'd thro' this whole Undertaking.

At the End of every Walk, in the View, as one passes along, are plac'd some of the Fables of *Æsop*, which all of them are a continual Entertainment to the Ambulator.

The Walks are cut out (on Plate 8) in a Wood; and so there is a considerable Thickness of Wood between Hedge and Hedge, which, in Truth, is much better than our single Hedges; besides theirs are of quite another Use and Turn from what ours are; but having given one of each, I have, I hope,

done

done what is requir'd of me, chooſe which you will. Their Way is fitteſt for very large Spots of Ground, but ours for ſmall ones; but there is one Thing particularly attends ours, which is the Narrowneſs of the Walks, by which Means the Hedges muſt be always kept clipp'd; and which, in theirs, and according to our Method of Rural Gardening, need not. But I paſs over this, and come to ſome other Centers, Figures, and Ornaments, in our Wood Work; and the firſt is deduc'd from Architecture.

Amongſt the ſeveral Arts and Sciences from which the Theory and Practice of Gardening receives its Beauty, this of Architecture is the greateſt, whether we conſider it in Reſpect of the Rules and Terms we borrow from thence, in the laying out and diſtributing 'em, or the Idea's we receive from thence in Point of Deſign.

We have, in ſome Places of this Kingdom, already ſome faint Pourtraitures and Beginnings, of deſigning and laying down ſome little Spots of Gardening, in the Manner that the Ichnography or Plan of a Building is; and by the Means of Eugh and other tonſile Greens, to imitate the Elevation thereof, in Columns, Pilaſters, Niches, *&c.* And this I remember to have ſeen ſomething of at *Winchendon*, againſt a Wall there, where the Greens are cut into Pilaſters, *&c.*

From

From these Beginnings, I thought I could not better employ my Time, than in giving one Plate, to farther and improve what has been so imperfectly began; since hereby one of the greatest Additions may in Time be made to the Beauty of our *English* Gardens, that has in any Age or Country been made. And the Truth is, when we consider the great Quantities of tonsile Plants we abound with, there is not, at first Appearance, any better Method of disposing of them than this, neither has any other Country so great an Advantage thereby as we have.

To prove this Assertion, we need only view those prodigious Magazines of Eughs, Hollies, and other Greens, that are growing about *London*; and how much they may add to the Beauty of our wildest Plantations, by being us'd sparingly, in some Centers of our natural Wood-Works, where the Owner is often glad to find some few Elegancies, and neat little Gardens, made and kept by Art, amidst the Variety of natural Objects he is creating to himself, and with which he is by Nature furnish'd: Such, in particular, is that beautiful Hollow at *Kensington*, with the several Cabinet-Recesses and Niches round it; and such as this Plan, or any other of this Kind, may present him with; there is something in this entirely pretty and new in Gardening.

To

To begin then (by Way of Deſcription) at the circular Steps, on the Extremities of the Draughts, you riſe up into an handſome Avenue, planted on each Side with Eughs, planted and cut into double Pilaſters, each bounded with a ſhady Corridore or Piazza; and theſe, if the Eughs are planted large, *viz.* ſeven or eight Foot high, will ſoon form themſelves, by a little cutting, into Arches, Vaults, Groves, and all the other Beauties we borrow from Architecture.

I ſhall, at the latter End of this Treatiſe, when I am ſpeaking of the particular Ornaments of Gardens, amongſt our Arbour-Work, give ſome little Plans and Uprights of this Way of working; and in the mean Time have thought this not improperly plac'd amongſt our Woody Scenes.

To proceed then in the Deſcription of this Plan, you come by Degrees into the Center, or Middle, whereas you had before been introduc'd by double Pilaſters, on each Side of your main Paſſage, Avenue, or Cloiſter; the Middle it ſelf is environ'd with circular ſingle Columns, and in the Inſide with Niches and Pilaſters; in which Niches, I ſuppoſe, Statues, Urns, or other ſuch like Decorations, which, being white, will be very much ſet off by the Darkneſs of the Eugh; and at each Angle I have propos'd (as appears by the Deſign) that there ſhall be little Salloons, with Seats to ſit down, or what elſe may be thought an Addition thereto.

'Tis

'Tis eaſy to obſerve likewiſe, that on each Side are ſeveral little Rooms or Cabinets of Retirement, one within another; and, as all of them are furniſh'd with Niches for Statues, Urns, and other Vaſes, and in the Middle ſome little Graſs-Plat or Fountain of Water, I cannot but hope it will be thought extreamly pretty and diverting; and for the farther Accompliſhment of this Kind of Work, the Plates I have already intimated, that are to be at the End of this Treatiſe, will ſufficiently direct.

The Entrance and Center being thus explain'd, at the upper End (as we term'd it) may be obſerv'd a Mount, of two Riſings, in all eight Foot high, planted round with ſquare Eughs, at about four Foot Diſtance, (let it be more or leſs on the Draught;) and theſe will likewiſe, in a little Time, form Arches, Pilaſters, *&c.* and, in ſhort, a natural Cover from the Sun. And this Elevation is ſo much the more to be deſir'd, becauſe 'tis there we may ſtand and look round, and with Eaſe view all the adjacent Works, and particularly theſe natural Corridores, which tho' they will be expenſive in keeping, muſt be eſteem'd the moſt ſurpriſing Decoration that any of our Gardens yet afford.

I need ſay little as to the other Centers in the Outſides of this Work, they explaining themſelves, being no otherwiſe than what is and has been common enough with us; but thoſe

To begin then (by Way of Deſcription) at the circular Steps, on the Extremities of the Draughts, you riſe up into an handſome Avenue, planted on each Side with Eughs, cut into double Pilaſters, and each bounded with a ſhady Corridore or Piazza; and theſe, if the Eughs are planted large, *viz.* ſeven or eight Foot high, will ſoon form themſelves, by a little Cutting, into Arches, Vaults, Groves, and all the other Beauties we borrow from Architecture.

To proceed in this Plan, you come by Degrees into the Center, or Middle, and whereas you had before been introduc'd by double Pilaſters, on each Side of your main Paſſage, Avenue, or Cloiſter; here the Middle it ſelf is environ'd with circular ſingle Columns, and in the Inſide with Niches and Pilaſters, in which Niches, I ſuppoſe, Statues, Urns, or other ſuch like Decorations, which, being white, will be very much ſet off by the Darkneſs of the Eugh; and at each Angle I have propos'd (as appears by the Deſign) that there ſhall be little Salloons, with Seats to ſit down, or what elſe may be thought an Addition thereto.

'Tis eaſy to obſerve likewiſe, that on each Side are ſeveral little Rooms or Cabinets of Retirement, one within another; and, as all of them are furniſh'd with Niches for Statues, Urns, and other Vaſes, and in the Middle ſome little Graſs-Plat or Fountain of Water, I cannot but hope it will be thought extream-

ly pretty and diverting; and for the farther Accomplishment of this Kind of Work, the Plates, I have already intimated, will sufficiently direct.

The Entrance and Center being thus explain'd, at the upper End (as we term'd it) may be observ'd a Mount, of two Risings, in all eight Foot high, planted round with square Eughs, at about four Foot Distance, (let it be more or less on the Draughts;) and these will likewise, in a little Time, form Arches, Pilasters, *&c.* and, in short, a natural Cover from the Sun. And this Elevation is so much the more to be desir'd, because 'tis there we may stand and look round, and with Ease view all the adjacent Works, and particularly these natural Corridores, which tho' they will be expensive in keeping, must be esteem'd the most surprising Decoration that any of our Gardens yet afford.

I need say little as to the other Centers in the Outsides of this Work, they explaining themselves, being no otherwise than what is and has been common enough with us; and the Disposition of the rest is easily manag'd. I could be more particular in describing this Plan, but I fear I have hitherto been too prolix in the pleasurable Part of Gardening, for which Reason I shall omit it.

CHAP.

CHAP. VIII.

Of Eſpalier Trees, Hedges, &c. and their Management.

AS a general Security for a Garden or Plantation againſt Blaſting and tempeſtuous Winds, it is neceſſary to plant ſubſtantial and lofty Vegetables; theſe are call'd Eſpaliers, and are likewiſe us'd for the bounding of Borders, Walks, Avenues, *&c.* but moſt commonly for the Defence of Plants and Greens.

The ſeveral Sorts of Trees fit for Eſpaliers, are, the *Dutch* Witch and *Engliſh* Elm, the Lime, Abeal, Pine, *Scotch* Fir, Siccamore, Beech, and Oak; but the Elms and Limes are very preferable to the others; and the Firs and Pines, next to them, deſerve Place. In the Choice of theſe Trees, and Tranſplanting, great Care ought to be taken; they muſt be ſtrong, and the larger the better, as they will

the ſooner anſwer your Purpoſe: You are to take them out of their natural Earth with as much Root to them as is poſſible, and they ought to be moderately prun'd, ſo that their Heads be not left too tall at their firſt Planting.

If your Eſpaliers are *Pines* and *Firs*, they are to be elected from ſome Nurſery when they are about three or four Foot high, but not tranſplanted 'till they arrive at ſeven, eight, or nine Foot in Height; when they are to be taken up with almoſt all their Roots, and as much Earth about them as three or four Men can carry with each Tree in a Hand-barrow; this Earth, remov'd with them, will be a great means to fix them where they are to be planted anew, and likewiſe prevent all ill Conſequences which might hinder their Growth.

Your Trees thus choſen, we come to the Planting, which muſt be by no means too deep, eſpecially if the Ground incline to Moiſture, for thereby many Trees are ſpoil'd. As ſoon as they are planted, Care is to be taken that they be very well ſtak'd, or otherwiſe fenc'd, as a Guard againſt violent Winds and Cattle, 'till they have taken Root ſufficient to ſubſiſt of themſelves; and they are, upon all Occaſions, to be plentifully water'd. The *Firs* being perpetually green, and aſpiring to a great Height, appear very beautiful; and what adds

adds to their Uſefulneſs, is their long Duration.

Before Gentlemen begin to make their Gardens, theſe Plantations of Eſpaliers ought to be finiſh'd, that no Time may be loſt, or Injury enſue to the tender Plants for want of a neceſſary Security. They are to be planted at a reaſonable Diſtance without the utmoſt Bounds or Walls, and the Method of doing it is this; Firſt draw Lines for two or three Rows, pretty thick, having Regard to the Uſe they are for; and when the firſt Line is ſet, let the ſecond be planted in ſuch Order, that every three Trees may make an Æquilateral Triangle, by which means the firſt Range will be clos'd by the ſecond; after this, a third Line is to be planted, which muſt bear the ſame Proportion to the ſecond, as the ſecond does to the firſt: And with theſe Ranges of three Rows the whole Plantation, or Garden, may be encompaſs'd, if it can be conveniently done.

This Way of Planting is of excellent Uſe and Benefit to all Perſons who intend to make large Plantations of Firs and Pines for Avenues, Views, or Walks of Shade in Paſture Grounds, Parks, or other grazing Grounds, or to bound their Gardens by delightful Viſto's. And if you are to make Eſpalier-Hedges, for the Defence of tender Greens and Plants, from malevolent Winds, the Trees for your Uſe are the following; the *Dutch* Witch and *Engliſh* Elms, as before,

the Horn-beam, Spruce Fir, Pine, and *Scotch* Fir, Lime, Privet, Yew, Holly, Laurel, White-thorn, Maple, Alder, Apple, Pear.

The *Dutch* and the *Witch Elm* are the freeſt Growers, and come ſooneſt to Perfection; And if they are for a Frame of Wood, and to be ſerviceable the firſt Year, they are to be choſen of two Sizes, the firſt about eight or ten Foot high, and the ſecond about four or five Foot in Height; to be good bruſhy Trees from Top to Bottom as near as may be, and let them be prun'd, but ſo that the Side-Boughs may remain to ſpread out and be faſten'd to the Frames. The large ones are to be planted about three Foot Diſtance from each other, and between them are to be planted the leſſer ſiz'd ones. But if your Eſpalier Hedges are to be made without a Frame of Wood to ſupport them, then the Trees muſt be of a ſmaller Size, the largeſt to be not above ſix Foot in Height, and the ſmall ones of about three or four Foot high; they are to be planted as the others, but the Boughs muſt be cut within an Inch or two of the Stem, and as they grow they are to have frequent Clippings to make them thicken in Bruſh, and grow upright and uniform, whereby they'll appear like a Wall.

The *Horn-beam* and *Beach* are inferior to none, for an Eſpalier, of thoſe Sorts of Trees as ſhed their Leaves; but they cannot be planted ſo large as Elms. Chuſe

two

two Sizes, the largeſt of four or five Foot high, and the ſmalleſt of two or three Foot, and plant the largeſt at eighteen Inches Diſtance. The *Spruce Fir* has great Advantage over the others, by it's being green all the Year, and it will beſt endure a diſcretionary Clipping; let the largeſt Plants be about three Foot and a half long, and the ſmalleſt about two Foot in Length, and plant the large ones about eight Foot aſunder, with the ſmaller Size Plants between them. The *Pine* and *Scotch* Fir require the ſame Management

In the ordering *Limes* for Eſpaliers, the largeſt Size may be ſix or ſeven Foot high, the leſſer three Foot high, to be planted in the ſame Order and Diſtance as the *Elm*. *Yew* makes a noble, firm, and durable Eſpalier, and for this Uſe will excel the beſt Brick-Wall; you are to make a Choice of the largeſt of about a Foot and a half high, and the leſſer about nine Inches, or a Foot, the large ones to be planted about two Foot aſunder, and the ſmall ones between them. The *Holly* makes an excellent Eſpalier, continues green all the Winter, grows exceeding thick, diſdains the Power of the ſevereſt Storms, and if theſe Trees are well manag'd they'll grow at leaſt two Foot in a Year.

The *Laurel*; the large Plants to be about three or four Foot high, and the ſmall ones about a Foot and a half; the largeſt to be

planted at three Foot Diſtance. *White-thorn* and *Privet* make very good Hedges, but they are not to be planted ſo large as other Trees. *Maple*, if planted of young Sets, will make tolerable Eſpalier Hedges, and thickens well after Clipping; and Alder for a wet or moiſt Ground, makes a ſubſtantial Hedge. *Apples* and *Pears* will make good Eſpaliers; if your Choice be of the largeſt Size from Standards aſpiring in height, and growing upright, and the ſmaller of Dwarfs, or good buſhy young Trees; the Sizes to be much the ſame as the Elm, and they are to be planted abour four or five Foot Diſtance from each other: Theſe laſt mention'd Eſpaliers are very uſeful for the bounding of Kitchen Gardens from the Sight of Walks or Gardens of Pleaſure.

The wooden Frame for Eſpalier Hedges is neceſſary where the Uſe of thoſe Hedges is requir'd, the firſt or ſecond Year after planted. Theſe Frames are to be made very ſubſtantial, about ſeven, eight, or nine Foot high; the Diſtance of every Poſt aſunder, and the length of the Rails to be equal to the length of the Poſts, which is commonly about eight Foot for an Eſpalier Frame of the ſame Height from the Surface of the Ground; and to this Frame there may be ſix Rails, each being about ſixteen Inches aſunder. The higher the Trees are that are planted, the more ſubſtantial ought the Poſts to be for their Support, and Care muſt be taken that the Frame be erected upright and ſtraight;

ſtraight; and all the Sizes of Eſpaliers, for theſe Frames, are to be ſo regulated, that the Trees or Plants may be of a handſome uniform Growth, and ſufficiently furniſh'd with Side Boughs, to thicken and fill up the ſeveral Spaces.

The Form of the Ground for Eſpaliers ought to be oblong; and in laying it out, the two longeſt parallel Sides ſhould run *North* and *South*, or thereabouts; and as for the Extent, you are to proportion it according to the Number of the tender Greens and Plants which you deſign it ſhall receive; always allowing for proper Diſtances in placing them, and for Allies. The Situation ought not to be remote from the Green-houſe, for Convenience in removal of the Greens, forward and backward, as Seaſons ſhall require. In marking out the Dimenſions make Allowance likewiſe for the Borders, which ſhould be anſwerable to it, and well trench'd, two Foot and an half or three Foot deep; for if the Soil happens not to be naturally good ſo deep, and you do not enrich it, after the Trees have been planted ſome Years, when they come to ſtrike Root, they'll penetrate down to the poor barren Earth, and become thereby exceedingly hinder'd in their Growth.

Eſpaliers deaden the Violence of the Winds with greater Security to tender Greens and Plants than the beſt Brick or Stone Wall, by Reaſon Walls, being compact and cloſe built, have a ſtronger Power to drive them back

and

and therefore detriment the tender Plants that are near; but if the most tempestuous Wind beats against these Espaliers, (especially if they are made of Spruce Fir, Holly, or Yew) they give Way to its Force, without any Manner of Repulse, or Injury to the tender Plants encompass'd by them.

Pines and all Sorts of *Firs* look very well when planted as Espaliers; they make a fine tow'ring Figure in the Winter Season, when all other Trees are rusty, and the Fields have likewise lost their Verdure; and if they are planted on a rising Ground, so as to be in View at a distant Prospect, they appear very noble, and agreeably adorn a magnificent Seat. I proceed now to the profitable Part of Gardening.

CHAP.

CHAP. IX.

Of Fruit-Gardens; Planting, Pruning, Graffing, &c. of Fruit-Trees.

THE Situation of a Garden is always the firſt Thing to be taken Care of; and tho' a little Valley, or low Ground, is the moſt agreeable for Kitchen-Products, yet Ground on a moderate Elevation, ſo as not to be too dry, is every way beſt for the Fruit-Garden: For if the Fruits do not grow ſo large in ſuch a Soil, yet it will be recompenc'd in their Beauty, Richneſs of Taſte, and Forwardneſs: But if your Situation be ſo high as to incline to Drought, or be on an exact Level, 'twill be neceſſary to lay out your Ground on a little Inequality, but ſuch a one as may be unperceiveable, and that the Water in the Southern Walks may fall to the Roots of the Trees.

Next

Next to the Situation, the Expoſition of a Garden is to be regarded. And whatever Situation you are forc'd to ſubmit to, it ought to have all the Aſpects of the Sun; tho' the Variety of Soils makes, in many Caſes, a particular Expoſition the moſt agreeable. If your Garden be of ſtrong Earth, and of Conſequence cold, the South Expoſure is beſt; but then this Expoſition is very ſubject to Winds in the Autumn. If the Soil be light and hot, then the Eaſt Expoſition is to be preferr'd; but this is annoy'd by the North-Eaſt Winds, and the Wall-Trees have little Benefit of the Rains which generally come from the Weſt. The Weſtern Expoſure is very liable to the North-Weſt Winds in the Spring, and the Autumn Winds. And the Northern Aſpect is only fit for Pears and Baking Fruits: So that all theſe Expoſitions having their Defects, upon Experience it is found beſt to have Walls erected for Fruit, not directly facing the cardinal Points, but between them; as, the South-Eaſt and South-Weſt Aſpect for the beſt Sort of Fruit, and the North-Eaſt and North-Weſt Aſpect for the worſt Sort, which will generally anſwer all Expectations.

The beſt Figure for a Fruit-Garden, is a Square about half as long again as broad; and the Extent may be from forty Yards in Length, and twenty four in Breadth, to one hundred and ſixty Yards, and one hundred; tho' thirty or forty Yards ſquare is a ſufficient Compaſs of Ground for a Garden to con-

contain the moſt delicate Fruits; and ſquare Plats of Ground are the moſt commodious, as uniform Beds of Strawberries, Artichoaks, Aſparagus, Sallading, *&c.* to fill up the Spaces, cannot be well laid out in Ground of irregular Dimenſions.

When the Situation and Expoſition of a Garden are fix'd, and the Extent laid out, the next Thing we come to is the beſt Fruits; of which I ſhall give a ſhort but uſeful Catalogue for all Expoſitions.

For a South Aſpect, inclining to the Eaſt or Weſt, the beſt Peaches are the *Red and White Magdalene*, the *Minion*, the *Royal Peach*, the *Old Newington*, the *White Peach*, the *Purple*, the *Admirable*, the *Chevreux*, the *Nivet*, the *Bourdine*, the *Red Roman Nectarine*. Apricots for Eaſt and Weſt Walls, are the *Orange Apricot* and *Maſculine Apricot*. Figs againſt a South-Eaſt or South-Weſt Wall, the *White Fig*, and *Long Purple*. Pears for the South-Eaſt or South-Weſt Aſpect, are the *Buree du Roy*, the *Summer Bon Cretien*, the *Orange*, the *Verte Longue*, the *St Germain*, the *Magdalene*, the *Ambret*, the *Colmar*, the *Muſcat*, the *Ambret*, the *Spaniſh Bon Cretien*, the *Chryſan*, the *Winter Bon Cretien*: For North-Eaſt or North-Weſt Walls, the *Katherine Pear*, the *Orange Bergamot*, the *Rouſſellet*, *Worceſter Black Pear*, are the moſt proper; and for Dwarfs, the *Bergamot*, *Windſor*, *Swan's Egg*, *Cuiſſe Madam*, &c. Of Plums there are few fit for the beſt Walls beſides

the

the *Imperial Blue and White Perdigron* and the *Apricot* Plum: For the worſt Walls and Dwarfs, the *Royal*, the *Orleans*, the *Violet*, the *Muſcle*, the *Perdigron*, the *Queen-Mother*, the *Damaſcene*, the *Yellow Ruſſet*, the *Pear-Plum*, the *White Bonum Magnum*, the *Damſon*, are to be choſen. Cherries for Dwarfs or Standards, or againſt Eaſt or Weſt Walls, the *May-Duke* and the *Orleans*, or *Bloody Heart*; and the *Morella* for a North Wall.

This Collection of Fruits will very well ſerve for your beſt Fruit-Garden; and before I come to their Planting, it may not be amiſs to obſerve, that Peaches and Vines thrive beſt in dry light Ground; that Plums, Cherries, *&c.* delight in a ſtrong Earth; and Figs, Pears, Apples, *&c.* agree with all Sorts of Soils, provided the Ground be near three Foot deep. The Seaſon of Planting is from the Middle of *October* to the Middle of *March*, but it is not to be undertaken in froſty Weather. And the Autumn is preferable to the Spring, by reaſon the Tree, during the Winter, will be better fix'd and ſettled, ſo as to withſtand the Winds in *March*, and Drought of the Spring. For the Diſtance to be obſerv'd in planting of Fruit-Trees, a Wall of ſeven or eight Foot high, will require the Trees to be planted about fifteen or ſixteen Foot aſunder: And if the Wall be ten Foot high, twelve Foot Space will be enough; but the Apricot, Plum, and Cherry, ought to be planted at a greater Diſtance than a Peach or Nectarine.

When

When the Ground is not extraordinary good, it is to be enrich'd before you commence your Plantations: You muſt firſt dig Holes where you intend to plant your Trees, about three or four Foot ſquare, and two Foot in Depth, which are to be fill'd up again with a good Compoſt of Dung and Mould; wherein you are to obſerve, that if the Soil be a hungry Gravel, or Sand, rotten Horſe-Dung and Cow-Muck, mix'd with rich Mould, will be proper; and if your Ground be Marl, or ſtiff Clay, you are to get a Compoſt of Rubbiſh, Lime, ſmall Pieces of Brick and Tile, Coal-Aſhes, and Drift-Sand, to mix with Dung and Mould: Fill up the Hole with this half a Foot higher than the reſt of the Level, and take Care to preſerve ſome of the fineſt Mold near the Top, to plant your Tree in, and it will do very well: But untry'd Earth, dug from a Waſte or Common fed with Cattle, is the beſt and moſt agreeable Soil for the Roots of all manner of young Trees.

Your Ground thus prepar'd to receive your Trees, and Stakes being put in the Middle of the Holes, as Marks where to plant them in the Order you intend, I come to the Planting, wherein I ſhall firſt take Notice of the Pruning neceſſary. When you have made a good Choice of Trees from well-manag'd Nurſeries, you are to ſhorten the bigger Roots to about ſix Inches from the Stem, and to take off all the ſmall Fibres; and the Head muſt be prun'd ſo, as to leave not above two Branches

Branches, and thoſe reduc'd to about ſix Inches above the Place of Grafting: A ſingle Branch is ſufficient for a Head; and this Pruning may be done any Time before its beginning to ſhoot in the *Spring*.

If your Tree be for the Wall, ſet the Root as far from the Foundation as the Top will allow: By this Means the Root will have a greater Liberty to ſpread backward, and conſequently the Tree will thrive the better. When the Tree is thus plac'd in the Ground, with the Head ſpreading againſt the Wall, fill the Hole with the Mould, wherein if the Tree be young and tender, you are to take Care to fill in the Soil gently, but for others leſs Care will ſuffice. And the laſt Thing is the Security of the Root from Froſts, which may be done by laying half rotten Dung all round the Tree, and upon that Fern or Straw five or ſix Inches thick, two or three Foot every Way from the Body of the Tree: But to keep the Roots cool and moiſt in the Summer, a ſmall Quantity of Sand and Pebble-Stones laid round, a little Diſtance, will be moſt effectual.

Where you ſet Trees in Borders, in the preparing of your Ground, it is a common Practice to make a Trench by the Wall-Side, two Foot broad and the like Depth: For this Trench you are to mingle good old Dung with the Earth, and fill it up lightly near as high as you intend the Borders to be, and then you are to tread it down, ſo that it be not above

above half full in the Places you design to set the Trees. But where the Soil is defective in the Bottom, or a young Tree is planted in the same Place and Soil where an old one has been, you must prepare your Ground with Compost as far as the Roots of the young Tree need to go, or the old ones has grown: And it is very prudential to set the Trees shallow, and raise the Earth about them, tho' in a warm dry Soil a little Elevation will serve; but in a wet Clay you cannot ordinarily plant too high; and altho' some of the bigger Roots should afterwards appear above the Surface of the Earth, they will do very well, if you in the Beginning cover the Roots with the best fine Mould, (and herein you are to allow for the Settling of the new Earth, which usually sinks three or four Inches) and preserve them moist for one Year against the scorching Heats of the Sun.

These are the most useful Observations relating to planting of Fruit-Trees; and as they chiefly concern Wall-Fruit, before I conclude this Head, I shall communicate a few Observations relating to the building of Fruit-Walls.

Of all Materials proper for building of Fruit-Walls, Brick is certainly the best, it being not only the handsomest, but the warmest and kindest for ripening of Fruit, besides the most convenient for Nailing; for small

Lath-Nails will in this Case suffice, whereby a considerable Expence is sav'd, which would be unavoidable in Stone-Walls, where the Joints are larger: And your Brick with Copings of Freestone, and fine Stone Pilasters, or Columns, at proper Distances, to separate Trees, and break the Force of Winds, make the most beautiful and profitable Walls of any other whatsoever.

Some Persons advise, in the building of Garden-Walls to make them with Half-rounds, every Semicircle being eight Yards round on the Inside, and about six Yards in the Face or Diameter, each taking in two Trees; and that between every Half-round there be two Foot Breadth of plain Walling, on the Top of which may be plac'd a Flower-Pot about two Foot in Height, to contain a handsom Green, and a Vine to be planted at the Foot, to fill up the Space to the Top: By Means of these Rounds every Part of the Wall will, one Time of the Day or other, enjoy a Share of the Sun; and the best Walls will not fail of being exceeding hot by the Reflection or Collection of the Sun-beams in the Rounds, and also be more secure from pernicious Winds.

In some Parts of *England* I have known Walls built partly of Stone and partly of Brick, which have been exceedingly commodious: The Brick of itself is not substantial enough for Walls in some Places, nor indeed is its Duration any where equal to Stone; wherefore a great many Gentlemen, to have both

both ſubſtantial and wholeſom Walls for Fruit, have been at the Expence of building a double Wall, the Outſide being compos'd of Stone, and the Inſide of Brick, or rather a Stone-Wall lin'd with Brick. And where you are to build Walls for Fruit, againſt Terras-Walks, to prevent the ill Effects of Damps, it is a very good Method to leave a Space of about two Foot the whole Length of the Wall, between the inner Wall next to the Bank of Earth and the outward Wall, to receive your Fruit, whereby the laſt will be always render'd healthful, and the Products of Fruit will anſwer your Labours.

Theſe Methods of erecting Walls I muſt confeſs are very expenſive; but if you propoſe a Quantity of Fruit, you cannot well avoid them: Tho' Mr. *Laurence*, in his Tract of Gardening, makes Mention of Walls built of Earth and Straw well temper'd together, known by the Name of Mud-Walls, as proper for Fruit. Theſe Walls are common in *Northamptonſhire* and *Leiceſterſhire*, and this Gentleman affirms they are better than any other Walls for accelerating the Ripening of Fruit; and if they are made of very good Earth, and exactly temper'd, Nails will do to faſten the Trees; otherwiſe, Pegs of Wood muſt be made, ſuch as are us'd for bad Walls, particularly of Stone, where the Mortar is decay'd, and the Joints thereby become the larger. The large Coping of Straw that is uſually laid upon Walls of this Kind, is a

great Advantage to the Fruit, in ſheltering them, and keeping off all perpendicular Rains: But theſe Walls are by no means ſightly, for which Reaſon they are ſeldom us'd.

I had like to have omitted taking Notice, that Walls of an Eaſt Aſpect are preferable to thoſe of a Weſt, by reaſon the early Rays of the Sun free the Fruits the ſooner from cold and pernicious Dews, which, of Conſequence, renders them moſt healthful to all Sorts of Fruit. To conclude this Chapter; When your Trees are planted, if you permit them to ſtand with their tall Heads tack'd to the Wall, (to prevent their being ſhaken) 'till the Beginning of *March*, you are then to ſhorten their Heads carefully, cutting away the Branches ſlopewiſe, the Slope facing the Wall, with a ſharp Knife.

Pruning of Fruit Trees in general.

A ſkilful Gardener is not only a Phyſician to aged infirm Trees, but a Nurſe to the young ones; and he may, with good Management, make Fruit-Buds grow where he pleaſes, but not when he pleaſes; and this by a diſcretionary Pruning.

When a Tree is planted, and has produc'd two fine well-diſpos'd Branches, with ſome weak ones amongſt them, the only Buſineſs you have then to do, is to ſhorten them all equally to within five or ſix Inches in Length. But if the Poſition of the two Branches be irregular,

regular, as one lower than the other, or both on one Side, there muſt be but one preſerv'd to begin the Formation of a fine Figure.

It ſometimes happens that a Tree will produce five, ſix, or ſeven Branches the firſt Year; in which Caſe it is ſufficient that three or four of the beſt be preſerv'd; for the reſt muſt be wholly taken away. And a Multitude of Branches in the firſt Year, is not always a Sign of Vigour, they ſometimes proving weak, from whence you may conclude there is an Infirmity in the Roots; though in Pruning, generally, a vigorous Tree cannot have too many Branches, if they are well order'd, as a weak Tree can't well have too few.

The Sap of all Trees muſt be kept within due Bounds for their Preſervation, and greater Liberty is to be allow'd ſtrong Trees than weak ones; for which Reaſon all ſtrong and vigorous Branches are to be left of a greater Length than feeble ones, and the Branches of a ſickly Tree are to be prun'd ſhorter, and to be fewer in Number than thoſe of an healthful Tree. And it is beſt to prune weak Trees early, that the Sap may not waſte it ſelf on ſuch Parts as ought to be retrench'd. Fruit-Buds that are neareſt the End of the Branches, are uſually thicker and better fed than others.

In the pruning of Wall Fruit-Trees, all Branches which ſhoot directly forward, are to be cut off cloſe to the Branch from whence

they ſpring: And to preſerve your Trees in their Beauty and full Health, the utmoſt Care is to be taken to keep them from being crowded with Wood, and it is oftentimes neceſſary to take away even bearing Branches; for it is impoſſible that a too great Number of Branches can be well ſupply'd with Juices, whereby either the Bloſſoms will drop off, or the Fruit will never ripen, but wither on the Tree.

A convenient Space between one Branch and another is conſiſtent with Regularity, and conſtantly to be obſerv'd in all manner of Prunings: And that you may pleaſe the Sight, you are to take Care not to let one Branch croſs another, unleſs it be to fill a Space in the Wall, which is more unſeemly; though a ſlender bearing Branch may be ſometimes permitted to ſteal behind the main Body of the Tree, or its larger Branches, and be no Offence to the Eye, but may gratify the Taſte at the End of the Year.

The more Horizontally the Branches of a Tree are carry'd, the more apt and the better diſpos'd that Tree is to bear Fruit; and the more perpendicular the Branches are led, the more inclin'd ſuch a Tree is to increaſe in Wood. When ſmall weak Branches ſhoot from the like, and the third Shoot is ſtrong, always uſe them as falſe Wood: And it is very difficult to ſtrengthen weak Branches without ſometimes cutting away others that are ſuperior to them, even the upper Part of thoſe from which

which they ſhoot. Shoots put forth in *Autumn* are always bad, and muſt be taken off.

When an old Tree ſhoots ſtronger Branches towards the Bottom than the Top, and the Top appears in an ill State of Health, it will be neceſſary to cut it off, and form a new Figure from the lower Branches; but if the Top be vigorous, cut off the lower ones, unleſs it be thoſe that are well plac'd, to continue for the Benefit of the Tree: And where old Trees are very weak, to preſerve them, you are to diſburden them almoſt totally, leaving very few Branches for Wood, and thoſe to be ſhorten'd to five or ſix Inches, always taking Care that thoſe as are left be not over much waſted.

Theſe are the general Rules to be obſerv'd in the Management of Pruning, wherein I have been very exact and particular, without troubling the Reader with a tedious indigeſted Heap of Informations, or omitting any thing neceſſary. I proceed now to the particular Prunings for the various Sorts of Wall-Fruit Trees, and begin with the Peach.

Pruning of the Peach.

The *Peach* is ſo apt to put forth Plenty of bearing Branches, after it has been planted two or three Years, that there is no manner of Difficulty in making a Choice of thoſe as are good and for your Purpoſe; but where the Peach-Trees are vigorous, it is neceſſary to defer the firſt pruning 'till they are

ready to bloſſom, that you may be at the greater Certainty in preſerving thoſe Branches which may be moſt likely to bear Fruit, and then to ſhorten them as they require.

The Fruit-bearing Branches are eaſily known by their ſwelling Buds; theſe are to be reduc'd to five or ſix Inches in Length, but the laſt Year's Shoots may be left ten or twelve Inches long: And in about three Years Space the Wood muſt be taken away entirely at ſeveral Prunings; but in the mean Time you are to take Care to furniſh your Wall with other Wood. You muſt always cut out what great Wood can conveniently be ſpar'd, and take away all dead and yellow ſickly Branches.

You are not to commence your Pruning of the Peach 'till the hard Froſts are over. When you have reduc'd your Tree to Beauty and Order, you have little to do, but thining your Fruit 'till *Midſummer*, when the Shoots are to be ſhorten'd and faſten'd to the Wall; and 'tis no Matter in what Order you perform this Operation, (ſo as you give the Fruit all the Advantage of the Sun you can) becauſe it muſt be alter'd the next Pruning.

If your Peach Trees make too much Haſte to bear, it is a certain Sign of Infirmity, and they muſt be manag'd accordingly, by Pruning the Branches ſhort, and plucking off all or moſt of the Bloſſoms or Fruit; and this is leſs difficult a great deal than when a Peach is over vigorous; for then Nature is apt to

make

make a Confuſion, which requires great Skill to know what Branches to chuſe, and what to reject.

Stone Fruit, eſpecially Peaches and Apricots, require a ſecond and ſometimes a third Pruning; the laſt of which is to be perform'd towards the Middle of *May*, when the Fruit is either knit or blaſted.

The Culture and Management of the Nectorine and Apricot is the ſame with that of the Peach, but the latter is the moſt apt to run into Wood.

Pruning of the FIG.

Tho' this Tree is not very common in *England*, yet we have no Tree that produces a more plentiful Crop, if rightly manag'd and prun'd as it ought to be.

The Pruning of this Tree is very different from that of others; for as the Practice is to take off the ſmall Branches in pruning of other Trees, ſo here it is to be avoided, by Reaſon this Tree puts forth its Fruit chiefly at the Extremities of the laſt Year's Shoot, and commonly at the three laſt Eyes; but you may cut ſome of the weak ſmaller Shoots, which do not promiſe to bear, provided you do it cloſe to the great Wood.

You muſt take out the great Wood entirely, to avoid Confuſion; and the Branches of the Tree ought not to be permitted to grow too high, which would prevent their being full; therefore

therefore the new thick Branches ought to be ſhorten'd Yearly to a Foot or thereabouts, and the Bud at the End of the Branches to be broken off in the Spring Time, that inſtead of one ſingle Branch it may have two, and it may cauſe them to ſhoot out Figs the earlier.

The Seaſon of Pruning the Fig, is the latter End of *March*; and whatever you cut from the Fig, you muſt do it as cloſe to the great Wood or Root as you can; and I have known a whole Tree entirely cut down to the Roots after an unkind Winter, for its Recovery from a ſickly State of Health, which it has effected. Take care to keep it from Suckers, which this Tree puts forth in great abundance.

It is beſt in the Summer to let this Tree have ſome Liberty from the Wall, and not to let it continue cloſe tack'd, as other Fruit Trees; but in the Winter ſome of the ſtraggling Branches ought to be cut off, and the beſt and biggeſt Branches to be tack'd cloſe to the Wall in *November*, that they may be the more effectually ſhelter'd from the Froſts in the Winter, by a Defence of Mat or otherwiſe, eſpecially in an extreme cold Seaſon.

The *North-Eaſt* Wind, and ſometimes a *South* Wind, proves fatal to theſe Trees.

Pruning

Pruning of the VINE.

The Vine puts forth the moſt and the longeſt Shoots of any other Fruit-Tree; but the leſſer and weaker Shoots never bear any Fruit, and therefore they muſt be entirely taken away.

Vines require a firſt, ſecond, third, and ſometimes a fourth Pruning; the firſt Pruning muſt be done before the End of *February*, and herein the Vigour of the Tree is to be regarded: The Number of Branches to be left are to be proportion'd ſo, as to make no Confuſion in the moſt vigorous Trees; and the thickeſt and beſt plac'd are to be preſerv'd, limiting their Length to four or five Buds or Eyes, and the firſt and ſecond only generally bear Fruit.

The ſecond Pruning of the Vine is to be perform'd about the Middle of *May*, when the Branches have ſhot two or three Foot, and the Bunches of Grapes are perfectly form'd: The Manner of doing it is by pinching off the Branch about ſix Inches above the Fruit, after which you are to Nail it to the Wall. The third Pruning is to be commenc'd about *Midſummer*; the Deſign of this is to reduce the Multitude of luxuriant Branches, and to let in the Rays of the Sun, to accelerate the Ripening of the Fruit; but in the Operation you are to have a diſcretionary Regard to Rains and cold Nights, which

which we have ſometimes even at this Time of the Year. If the Fruit-bearing Branch be not very vigorous, it ought to be cut cloſe to the Fruit in *July*: And if your Vine be, on the contrary, extremely vigorous, it will produce long Shoots from the Extremity of the laſt Pruning, which muſt be ſhorten'd again, and makes the fourth Pruning.

A Vine ought to be always kept thinner of Wood than any other Fruit Tree, and for that Reaſon there cannot be too great Care taken in inſpecting what Branches of old Wood may be well ſpar'd, and how you can conveniently ſupply their Places with new Shoots that are vigorous. The old Wood is to be cut out, and the Branches of the foregoing Year are generally to be taken away, unleſs it happens to be an old Vine, and you cut off the old Stem, ſupplying its Place with a young one; or you have an Occaſion to encreaſe the Height or Spreading of the Tree, and then they ſhould be ſhorten'd to the leaving only two Eyes.

Pruning of the PEAR.

As the ſmall Branches of the Vine produce no Fruit, ſo likewiſe the large Branches of the Pear-Tree are uſeleſs in Bearing.

There are few Obſervations to be communicated relating to the Pruning of this Tree, beſides the general Rules already laid down; but thoſe are to be carefully follow'd, for this

the Pear, in a rich Soil, is apt to be very unruly, running prodigiously into Wood and luxuriant Branches.

For this Reason, Plashing is of the most Signification, especially of very vigorous Branches: Cutting them about half Way through, near the Place from whence they shoot, will sufficiently abate their Vigour. And to fill a Vacancy in a Wall, this Management is of great Use; for by this Means you may reduce your Tree to what Form and Order you please. But Plashing is not to be practis'd on any Tree but the Pear or Plum.

The full-bearing Buds of the Pear-Tree appear very visible in *November*, when the Leaves are off; and they are to be carefully preserv'd. All Branches proceeding from the Knob, whereon the Stalk of a Pear grew, are to be taken away, but the Knob it self is not to be cut. The Extremity of the last Year's Pruning is to be taken off, and all false Wood or Water-Shoots, *viz.* those as have Eyes at a greater Distance than ordinary, are to be perfectly cut away.

Winter and Summer *Bon Cretien* Pears spread and extend themselves beyond any others, wherefore you must allow them sufficient Room and Height; and a Confinement by short Prunings would render them barren and full of Wood.

A languishing Pear-Tree may be restor'd by Pruning, and Removal into better Ground; but

but this Management will not do with the Peach, especially if the Gum appear.

Pinching of Pears or Peaches, is an Operation perform'd upon thick new Shoots, within two or three Eyes of the Branch they proceed from: It is to be done on the Top of the thick Branches, which would otherwise remain useless from their Situation, and yet spend much Sap.

Cherries and Plums require little Skill in their Pruning, so that the general Directions are sufficient for their Management.

Grafting and Inoculating.

These are us'd for the Propagation of Vegetables. *Peaches*, *Nectorines*, and *Apricots*, are not to be rais'd any other Way than by Inoculation or Budding; and as for *Pears*, *Cherries*, and *Plums*, tho' they may be grafted, yet the Inoculating is to be prefer'd, it being less hazardous and more pleasureable.

The Method of Inoculation is thus: About *Midsummer*, or a Month before or after, which are good Seasons, take off a vigorous Shoot from a Tree you would propagate; then make a Choice of a Stock about three or four Years Growth, and in a smooth Place of it make a downright Slit in the Bark, a little above an Inch in Length, and another cross-wise, at the Bottom of that, to give Way to the opening of the Bark: This being done, with your Pen-knife gently loosen the

the Bark from the Wood on both Sides, beginning at the Bottom; then prepare your Bud, by cutting it off with your Pen-knife, and entering pretty deep into the Wood, as much above as below the Bud, to the Length of the Slit in the Stock. After the Bud is thus prepar'd, with the Point of the Pen-knife and your Thumb take out the woody Part of it, (but herein take particular Care that the Eye of the Bud be preſerv'd) then put your Bud in between the Bark and the Wood of the Stock, at the croſs Slit, leading it upward by the Stalk where the Leaf grew 'till it exactly cloſes: Then bind it about with coarſe woollen Yarn, the better to make all Parts of it regularly cloſe, and the Bud incorporate it ſelf with the Stock; and the Operation is done.

In three Weeks the Bud will be incorporated, and then you muſt looſen the Yarn, that it may not gall the Place too much, which will be dangerous in a vigorous Stock. The quicker this Operation is perform'd the better; and you are to put two or three Buds into one Stock of *Peaches* and *Nectorines*, that if one do not ſucceed, another may.

If your Buds inoculated in *June* do not hit, you may make a ſecond Attempt the ſame Year on the ſame Stock, and that with very good Succeſs. And any Time between the Beginning of *June* and the latter End of *Auguſt*, in a good Seaſon, moſt Trees may be inoculated; and ſometimes *Pears* may be inoculated

in

in *September*, and do very well: But Care is to be taken that the Branch or Shoot made Choice of for Buds to inoculate with, do not lye by any Time (as in Grafting) for it is to be immediately employ'd.

When your Stocks are large, and the Bark is become thick and ſtubborn, that it will not readily part, nor handſomely cloſe up, you muſt be content to graft; but you may inoculate on ſlender Shoots made near the Grafting Place, even the ſame Year. And in reſpect to Stocks in general, you cannot expect Succeſs, if the Bark does not readily part from the Wood on making an Inciſion with your Pen-knife, and the Sap run well. The *Cherry*, *Plum*, and *Pear*, rarely fail to anſwer Expectation in Budding; but the *Apple* is very apt to deceive us, becauſe the Bark is not ſo inclineable to part as in other Fruit.

There are a great many Ways of Grafting, but I ſhall ſatisfy my Curioſity with mentioning only four. The firſt is the ancient and common Method of Grafting in the Cleft, or Slit-Grafting, perform'd on *Pear*, *Cherry*, and *Plum* Stocks, the latter End of *February* or Beginning of *March*. After you have choſe your Stock, in a ſmooth Place cut the Head of it off ſlopewiſe, then even the Top horizontally with your Knife: This being done, make a Slit near two Inches deep down the Middle of the Stock, with a large ſtrong Pen-knife or otherwiſe; then prepare your Scion

(taken

(taken from a vigorous Shoot of the foregoing Year, and cut and laid in the Shade for about a Fortnight or three Weeks before us'd) ſloping it on each Side from a Bud or Eye, but leaving it thinner on that Side which goes into the Stock than on the Out-ſide, ſo that it may conform it ſelf to the Slit in the Stock; then place the Scion in the Stock, and cloſe the Bark of each exactly. This is all you have to do in this Operation beſides Claying, which is done by tempering Clay and ſhort Hay together, and putting it round the Stock and the lower Part of the Scion, but ſo as not to diſturb the latter. The Scion muſt not be left with above three or four Eyes above the Stock: And in Caſe the Stock be large, you may put in two Scions in the Cleft, one on each Side. If the Stock be very large you may uſe a Mallet and a large Knife, or other ſharp Inſtrument, to make your Cleft, and prepare a Stick of hard Wood, by cutting it ſlopeways, to put into the Slit upon pulling out your Knife, and keep it open for the Scion; And if your Stock be ſo ſtrong as to pinch your Grafts, it will be neceſſary to drive a ſmall Wedge of dry Wood into the Slit, but not ſo as to let the Scion looſe.

Grafting in the Bark is the next Method I have to obſerve, and this is preferable to the other, but it is generally perform'd only on off *Apples*. The Way of this Grafting is to cut the Head of the Stock, as already directed, but

inſtead of ſlitting the Stock, ſlit only the Bark, a little above an Inch on the South-Weſt Side, or as long as the ſlop'd Part of the Scion; and at the Top of the Slit looſen the Bark with the Top of your Knife: Then with a ſmooth Inſtrument, made of Ivory or hard Wood, cut ſlopewiſe, as the Scion, make Room for the Scion, by thruſting it down between the Bark and the Wood of the Stock, where the ſame was ſlit: This done, take your Scion (being prepar'd with a flat Slope about an Inch long, ending on a Point, and begun from the Backſide of an Eye) and put it into the Stock, thruſting the Top of the Slope as low as the Top-Surface of the Stock, but firſt taking out your opening Inſtrument; and you are to order the Bark on each Side the Scion to fall cloſe to the Stock: All which being done, you are to clay it over as before. This Grafting is to be perform'd in the Beginning of *April*, and is eſteem'd beyond the other, as the Union of the Scion and the Stock is the ſooner compleated, and the Stock receives not ſo grievous a Wound.

The third Method of Graftng is by Approach, or Inarching; this is perform'd where a Stock grows ſo near another Tree, whoſe Fruit you would propagate, that it may be join'd with a Branch of that Tree, by cutting the Sides of the Branch and Stock about three Inches long, and ſo fitting them, that the Paſſages of the Sap may meet; in which Poſture let them be bound and clay'd:

When

When they are well cemented, cut off the Head of the Stock about four Inches above the Binding, and in the Month of *March* following cut off the Stub that was left of the Stock, as alſo the Scion underneath; then cloſe the grafted Place, that it may ſubſiſt by the Stock only. This Manner of Grafting agrees beſt with Vines, Oranges, Pomegranates, and ſuch like Shrubs; and is alſo done by cutting off the Head of the Stock at firſt, ſloping it about two Inches long, and joining the Scion thereto.

The laſt Grafting I ſhall take Notice of is Whip-Grafting: In this Operation both the Stock and Scion ſhould be of the ſame Bigneſs; the Stock muſt be ſlop'd a full Inch or more, and the like muſt be done to the Scion, and then one is to be ty'd upon the other; or elſe a Shoulder may be made on the Scion, to ſuit with which, the Top of the Stock ſhould be cut; then bind them together and clay the Place.

Having now gone through the ſeveral Sorts of Prunings, Graftings, *&c.* I ſhall finiſh this Chapter with the Stocks proper for all Kinds of Fruit. For Peaches, Pavies, *&c.* Stocks may be rais'd from the Stones of thoſe Fruits, or you may graft on the ſame Trees; Almond Stocks are alſo very good, as are likewiſe the Suckers of Muſcle-Plums and Pear-Plums, where thoſe Trees were never grafted. For Apricots and Plums, the ſeveral Sorts of Plum-Suckers will do, or Stocks of any Kind of

Plums, except the Damſon rais'd from the Stone. For Cherries, the Stocks that are rais'd from the common wild Black Cherries are beſt. For Pears, the Trees or Stocks that are rais'd from the ſeveral Kinds of Pears: And likewiſe the Quince Stocks are very good, as they cure the too great Luxuriancy of Growth common to theſe Trees, and for a Time anſwer the Purpoſe of bearing quickly; but they are not long-liv'd, neither do they bear ſuch fair large Fruit, or make ſuch handſome regular Trees as thoſe grafted on a Pear-Stock, for which Reaſon they are often rejected. Stocks rais'd from the ſeveral Sorts of Kernels are moſt fit for Apples.

CHAP.

CHAP. X.

Of Orchards, Vineyards, and their particular Culture.

THE Advantages arising from well-manag'd Orchards are so very considerable to the Owners, that I esteem an Account of their particular Culture worthy Place in a Treatise of this Nature.

And, first, I shall take Notice of the Preparation of your Ground for these profitable Plantations. If the Ground be a Turf or Green-Sward; it will be necessary to give it a thorough Plowing, two Years before you begin to set your Trees therein, to render it mellow and loose; and such Manure is to be employ'd, as is most agreeable for the Improvement of the Land. A flat, watery, and shallow Soil may be improv'd by plowing and ga-

thering up the Ground near the Places where the Trees are to be planted, and the Furrows between will help carry off the Water. But if the Land be ſpringy, it muſt be trench'd at the Head of the Spring, deeper than the Channel runs in the Earth: This Trench may be left open and cleans'd yearly, or fill'd with Oſier-Boughs, and cover'd at Top with the Earth and Turf that was dug up, and tho' the latter will raiſe the Ground much higher than the other Land; yet the Wood and looſe Earth will very much ſink it by Degrees.

The Situation of your *Orchard* ought to be choſen in Land a little declining, lying open to the South, South-Eaſt, or South-Weſt, and defended from the North Winds by Woods, Eſpalier Trees, Buildings, Grounds, *&c.* the Soil to be rather dryiſh than moiſt, the Earth fat, and natural Mould deep; for Orchard Fruit-Trees grow not only very large, but broad, and ſhoot into the Earth a conſiderable Depth. To preſerve the Trees from Winds, it is a very good Method to plant Walnut or Cheſnut Trees in Rows, two or three of them on the North Side of the Orchard, which will make a very good Defence; and ſome Shelter is likewiſe neceſſary on the Weſt Side, to break the Force of the Autumnal Winds, which do very great Injury in throwing down the Fruit.

If

If your Ground be uneven it ought to be levell'd, or elſe ſuch Trees as grow pendant, or are not apt to grow tall, muſt be planted in the higheſt Situation, and ſuch as are aſpiring, in the loweſt Places: And for the Poſition of your Trees, on the North Side you are to ſet the firſt Rows of Pear, or other Fruit-Trees, as are apt to grow talleſt, and the reſt ſouthward, as they decreaſe in Height, as near as may be judg'd; that ſo all of them may in a greater Meaſure partake of the South Sun, and be leſs liable to the Blaſts of the northern Winds.

In three Years Time after Grafting, Trees may be remov'd from the Nurſery into the Orchard; and the beſt Time for tranſplanting is from the latter End of *September* to the End of *November*, tho' the ſooner you begin this Work in Seaſon, the greater Succeſs you may expect. If the Leaves are not all fallen when the Trees are remov'd, they muſt be pick'd off; and if they are not very weak-body'd, they are to be prun'd, only three or four of the principal Branches muſt be left on the Top, that ſhoot outwards, which ſhould be quite lopped off when they arrive at almoſt a Year's Growth: But if the Trees are weak, thoſe chief Branches are to be prun'd to a Bud or ſmall Twig; and in all Caſes the Ends of large Roots are to be reduc'd.

Orchard Fruit-Trees are to be planted at no leſs Diſtance than eight Yards, and not to exceed fourteen, wherein Regard is to be had as well to the Kinds of Fruit-Trees to be planted as the Soil; for ſome Sorts of Trees take up a great Deal more Room in their Growth than others; and in rich Land no Perſon can be ignorant, but the Tree muſt arrive to a greater Stature than in a poor Soil; and a good Diſtance is always the beſt, not only for the Growth and Health of the Trees, but likewiſe for the Ripening of the Fruits.

I could here recommend a more than ordinary Care in the laying out of the Orchard, ſo as to make it appear with the utmoſt Beauty and Magnificence; I would have a handſome Walk all round, a grand one thro' the Middle the whole Length, and a ſpacious croſs Walk. This might be effected by planting all your Trees on a Line, leaving near a double Space between the Rows, in the Middle, on the Sides, and a-croſs, and planting the ſeveral Walks of ſeveral Sorts of Fruit; as the Middle Walk may be lofty Pear-Trees, the Croſs Walk your larger Kinds of Apple-Trees, one End Walk of Golden Pippins, the other of Cherries, and the two Side Walks of Codlins, or other Fruit-Trees in Hedges. This Method, and keeping your Walks mow'd, would make an agreeable Variety, and render your Orchard as delightful as a Grove or little Wood; but herein Care is to be taken to give the

the various Kinds of Fruit-Trees their proper Situations and Positions, otherwise the Beauty of your Orchard will lessen the Product of Fruit, and you may dearly purchase your Pleasure.

It is best to remove Trees very young, provided it can be done with Security, and that they be expeditiously set in the Places assign'd them after they are taken up, pruning the greatest Part of the Tops, but not cutting too much of the Root. And when you are to remove Trees of ten or twelve Years old, a circular Trench must be digg'd round them the *November* before they are transplanted, as narrow as may conveniently serve; but so deep as to meet with most of the spreading Roots, at such a Distance round about the Body of the Tree, as you would cut the Root off at when you remove it. As soon as the Trench is made, the Roots are to be cut off clear, and without splitting or bruising the Bark, and then the Trench is to be fill'd up again: These great Roots by the *October* following will have put forth many fibrous Roots, and have made Preparation for more; which, upon Removal, will enable the Tree to draw a greater Quantity of Nourishment than otherwise it would do, by which Means it will prosper the better in its new Situation. And Care must be taken in transplanting of large Trees, that the same Side of the Tree be planted to the South East, *&c.* as formerly stood that Way; unless it be a leaning Tree, when the inclining Side is to be set towards the South West,

from

from whence we have the ſtrongeſt Winds, without any Regard to its former Poſition.

In the Management of tall Orchard Fruit-Trees, you are to cut off all the Side Branches 'till the Trees are arriv'd to the Height deſir'd; but if the Tree be deſign'd to ſpread low, ſome Branches muſt be left on each Side, but not ſo many as to weigh down the Tree: And for the firſt three Years they are not to be permitted to grow buſhy-headed, which may be prevented by cutting off ſome of the inſide Shoots, and ſuch as grow croſs one another, or pendant. If the Soil be not rich enough, it is to be amended in two or three Years in the Winter, by opening the Earth round about each Tree on the Outſide of the Ground that was digg'd at their firſt ſetting, and in a Month after, with ſome proper Manure mix'd with the Mould that came forth, filling up the Trench again. Or the Soil may be improv'd by making a Trench along the upper Part of the Orchard, with a ſmall Gutter cut down to every Row of Trees, (the upper Turf about half a Yard's Breadth round about every Tree being taken off) and when a rainy Day comes, let the Draining of an adjacent Dunghill be let down one Row, ſo that, as near as may be, each Tree may enjoy it three or four Days at ſeveral Times in one Winter: But if the Poſition of the Orchard be ſuch, as not to admit of this Method, then you are to take two or three Pails full of Water enrich'd with Dung, and carry it to every

every Tree, pouring it in where the Roots were open'd, being firſt ſtirr'd at the Bottom, and putting in the old Earth again againſt the Spring.

When an Orchard is firſt planted, the Ground may be ſown with Beans, Peaſe, or other Kitchen-Legumes; or with Wheat, provided due Care is taken in collecting the Harveſt, not to injure the Trees with reaping Utenſils; and by this Means the Profit of the Soil may be continu'd from the Beginning: But in this Caſe the Ground muſt be ſubſtantially good, otherwiſe it will be ſo much impoveriſh'd, as to impair the Trees, and very much impede their Growth. The beſt Fence for an Orchard is the White Thorn, which may be plaſh'd when grown up, the better to prevent the creeping of Sheep or Swine into it; but no ſmooth quick Fence ſhould be ſet, their Tops and Roots, when grown, being injurious to the Hedge and Fruit-Trees. Plant two Rows of good Hawthorn, and a dead Hedge on the Outſide of the Ditch, and your Quick-ſet will grow the faſter; for if the Hedge be upon the Ditch, it is apt to choak the Quick: But for an old Fence about your Orchard, you are to plaſh it well, amend the Ditch, and cut down all the Trees on the Outſide of the Hedge, except on the North and Weſt Sides; the one requiring a Defence to keep the Orchard warm, as the other wants a Security againſt the Autumnal Winds: And the South and Eaſt Sides ought to be open, to

let

let in the Rays of the Sun, for the Ripening of your Fruit.

Of VINEYARDS.

That *Vineyards* may be ſo cultur'd in *England*, as to produce large Quantities of Grapes, and thoſe ſo well ripen'd, as to afford a good and ſubſtantial vinous Juice, needs no Demonſtration, when in ſeveral Parts of *Somerſetſhire* there are at this Time flouriſhing Vineyards; and the Vineyard of the late Sir *William Baſſet* in that County, has annually furniſh'd ſome Hogſheads of good body'd and palatable Wines, which I have been credibly inform'd by Gentlemen who have drank conſiderable Quantities of it with the greateſt Satisfaction.

It is not ſo much owing to the Inclemency of the Air here in *England*, that our Grapes are generally ſo very much inferior to thoſe of *France* and other hotter Climates, as to the Want of an exact Culture; tho' I confeſs at the ſame Time, that the beſt Management will not anſwer our Expectations without a tolerable Seaſon to ripen the Fruit; and ſometimes the Varioufneſs of the Weather in the Summer will unavoidably render the Fruit ſow'r and immature; but this does not always or generally happen, and therefore we are not to be diſcourag'd.

To

To proceed to the Culture and Management of Vineyards. When you have mark'd out the Ground design'd for your Vineyard, in the Month of *July* plough up the Sward, while the outermost Coat of the Earth is very dry and combustible, or burn-beak it, and in *January* following spread the Ashes. The Ground being thus prepar'd, cut Trenches a-cross from East to West, on rising Ground, that the Vines standing in Ranks in this Position, the Rising and Setting of the Sun may by that Means pass thro' the Intervals, which it would not do if they were set in any other Situation, neither would the Sun be so capable to dart its Rays upon the Plants during the whole Course of the Day. Afterwards strain a Line, and dig a Trench about a Foot deep; place your Setts in it at about three Foot Distance one from another; trim off the superfluous Roots, leaving no more than three or four Eyes or Buds upon that which is above the Ground, and plant them near half a Foot deep, sloping after the manner as Quick-sett is commonly planted, so as they may point up the Hill: That being done, take long Dung or Straw, and lay on the Trenches, of a convenient Thickness to cover the Earth, and to preserve the Roots from dry piercing Winds, which would otherwise much annoy them, and from the excessive scorching Heats in Summer. Keep them well hoed and free from Weeds, and water them as Occasion serves.

The

The beſt Time to plant is in *January*; and the firſt Seaſon of pruning the Vine is the Month of *January* in the next Year; and then you are to cut off all the Shoots as near as you can, except one of the moſt thriving ones, which is to be left with only two or three Buds 'til *May* the ſecond Year after planting; and clear the Roots of all Suckers, which draw out the Virtue of your Setts, and carefully deſtroy the Weeds. The ſame Management is requir'd the third Year, by taking away all the Shoots in *January*, but one or two of the moſt proſperous. Then dig your whole Vineyard, and lay it level, taking Care not to cut or wound any of the main Roots with your Spade: As for the younger Roots, it is not ſo material. And this Year you may enjoy ſome of the Fruit of your Labour, which, if anſwerable to your Wiſhes, will put you upon providing Props for your Vines, of about four Foot long, to be placed on the *North* Side of the Plant. In *May* rub off ſuch Buds as you ſuſpect will produce ſuperfluous Branches. When the Grapes are about the Bigneſs of Bird-Shot, break off the Branches with your Hand at the ſecond Joint above the Fruit, and tye the reſt to the Prop. This Breaking is preferable to Cutting, by reaſon Wounds made on Vines with a ſharp Inſtrument, are very apt to bleed.

The

The next Year after Bearing being the fourth Year, you'll have generally three or four Shoots to every Plant; and therefore in *December* cut off all the Branches, except one that is ſtrongeſt and moſt thriving, which you are to leave for a Standard about four Foot high, (taking away the reſt cloſe to the Body of the Mother-Plant) and to tye it to your Prop 'till it be large enough to make a Standard of itſelf: Neither muſt you permit any Shoot to break out, but ſuch as ſprout at the Top four Foot from the Ground; and theſe in *France* are commonly cut off every Year, depending upon the new Shoots, which are the only bearing Branches. But ſome propoſe to leave two or three Branches, one ſucceſſively after the other, and by this Management they always cut off the oldeſt every Year, and nurſe up the other young ones; tho' herein the Number of the Branches ſhould be proportionable to the preſent Condition of the Vine. In *Auguſt*, when the Fruit begins to ripen, break off thoſe Shoots that you find too thick, and take away ſome of the Leaves diſcreetly from the Fruit; and if in breaking the Shoots you perceive any Plant to bleed, rub ſome Aſhes upon it, or ſear it with a hot Iron.

If your Ground be poor, which will be diſcover'd by often ſtirring and the Weakneſs of the Crop, prune the Vines as is already directed, and ſpread good rotten Dung mixt with Lime over the whole Vineyard, letting it

it lye all the Winter to wash into the Earth, and mingling about ten Bushels of Lime with a Load of Dung; and if some Ashes and Soot be likewise thrown upon the Ground, it will do very well. Turn in this Manure about *February* with a slight Digging, but not too deep; and this is to be done in a dry Season, and not in wet Weather, lest it make the Ground bind too much, and encourage the Growth of rank Weeds. But to forward the Ripening of Grapes, and render the Plants fruitful, the Blood of Beasts mix'd with Lime or Soot is excellent to lay to the Roots of the Vines in *December* and in *July*; and if the Season be very dry, Watering in *August* is a very great Advantage to the Trees.

In the Management of your Vintage, gather your Fruit in a dry Day, while they are very plump and transparent, the Seeds or Stones being black and clear, not viscous or clammy, when the Stalk begins to shrivel at the Part next the Branch, which is a Sign it has done feeding; and if Rain or Frost immediately follow after they are thus fit to be gather'd, get them in as soon as is possible: It is best to cut, and not pull the Clusters of Grapes from the Vine, and to put them into Baskets, out of which take them gently, and lay them in Heaps on a Floor to sweat for four or five Days or a Week, which will very much accelerate their Ripening.

This

This is all I have to insert in this Volume; and I hope what I have mention'd, will prove a satisfactory Entertainment to all curious and polite Gentlemen, and perfectly instructive to those of my Profession. I shall conclude with some Lines from Mr. *Dryden*'s Translation of *Virgil*, which embellish the Character of a skilful Gardener: They are; (speaking of an old *Corycian* Swain)

He reaps the Product of his labour'd Ground.
His Limes are first in Flow'r, his lofty Pines,
With friendly Shade secure his tender Vines:
He ranks his Elms in even graceful Rows,
Is skill'd the grafted Pear-Tree to dispose:
He makes with spreading Planes a cool Retreat,
To shade good Fellows from the Summers Heat.

THE

INDEX.

A

Page.

ANgle, *Definition of, in Geometry* 5
Angle, *to cut into two equal Points upon Paper* 14
Avenues 216

B

Book, *for Measuring of Land.* 52
A Bill, *or Estimate* 57
Box *and* Needle *for Surveying* 65

C

Circle, *to strike on Paper* 16
Circle, *the Center to find out* ibid.
Circles, *Content of the Segment to find, and Circles divided* 48, 129
Chain, Gunter's *for Measuring* 60

Court-

Court-Yards p. 135
Court-Yards *describ'd on Plates* 138, 145

D

Distance, *accessible or inaccessible to take* 93
Description *and Use of measuring Instruments* 116
Dividing *of Lands* 117
——— *Of a Triangle several Ways* ibid.
——— *Of a triangular Piece of Land into any Number of equal and unequal Parts, by Lines proceeding from a Point assign'd* 118
——— *Of a triangular Piece of Land, according to any Proportion given* 119
——— *Of four-sided Figures or Trapezia* 120
——— *Of an irregular Plot of any Number of Sides, by a Strait Line thro' it* 123
——— *Of Lands an easy Way* 125
——— *Of a Circle, according to any Proportion, by a Line concentrick with the first* 129

E

Equality *of Things in Geometry* 9
Enneagon *describ'd, or a Figure of nine Sides* 22
An Estimate 57
Espalier *Trees, Hedges,* &c. 225
——— *First planted before the Garden laid out* 227
——— *Frames for them* 230

Espaliers, *in what Order planted* p. 231
——— *Their Use and Beauty* ibid.

F

Figures *Geometrical, crooked and curvilineal, mix'd and compos'd* 8
Fields *plotted, how done* 76, 86, 95, &c.
Fruit-Gardens 233
——— *Situation of* ibid.
——— *Exposition* 234.
——— *Catalogue of Fruits* 235
——— *Planting and Soils* 236
——— *Walls for Fruit, the several Sorts of, and Methods of erecting* 239
——— *Pruning of Fruit-Trees* 242

G

Geometrical *Instructions*, &c. 1
Gunter's Chain, *the Use of in Surveying* 60
Groves, *cut out into Walks*, &c. 205
Groves *and Labyrinths* 210, 219
Grafting *of Fruit-Trees, the several Methods of* 254

H

Hexagon, *regular upon a right Line given* 19
Heptagon, *or a Figure of seven Sides to make upon a Line given* 20
Heptagons, *to find the superficial Contents* 50

INDEX.

I

Instructions, *Geometrical, for Gardeners* p. 1
Instructions, *Numerical* 23
Index, *an Instrument for Measuring described* 65
Inoculating *of Fruit-Trees* 252

L

A Line *defin'd* 2, &c.
A Line *parallel to a right Line given, to draw* 13
A Line *given, to cut into two equally* 14
Laying *out of Lands* 130
Lawn *in a Park or Wood, the Figure of* 209

M

Measuring *and casting up uneven Ground to be remov'd* 31
Measuring, *several Operations of, in Arithmetick* 39, &c.
Measuring *Book* 52
Mensuration *of Lands Particulars of* 56
Measuring, *Stations for* 99
Measuring *Rods described* 116

N

Numerical *Instructions for Gardeners*, &c. 23
Needle *for Surveying* 65
New Lands *laid out* 131

O

An Oval *described upon a Length given, and to find the superficial Contents of* p. 17, 49
Octogon, *within a Circle* 21
Octogon *to make from a Line given* ibid.
Of Orchards 259
—— *Preparation of Ground* ibid.
—— *Disposition of Fruit-Trees* 261
—— *Laying out of Orchards* 262
—— *Planting* 263
—— *Fencing*, &c. 265

P

A Point *defin'd* 1
Positions *for putting Geometry in Practice* 11
Perpendiculars *elevated*, &c. 12
Pentagon, *to frame upon a Line given* 18
Pentagons *or* Polygons, *to find the superficial Content of* 50
Protractor, *the Use of* 62
The Plain Table 64
Plot *of a* Field *taken* 76, &c.
Of Parterres 183
Proportion *of Parterres*, &c. 185
Parterres *Figures of* 190
Pruning *of Fruit-Trees in general* 242
—— *Of the Peach* 245
—— *Of the Fig* 247
—— *Of the Vine* 249
—— *Of the Pear* 250

R

Rules *of Practice and Multiplication, for Gardening* p. 24
A Road *survey'd* 88
Remarks *in surveying of Land* 99

S.

Of a Superficies 6
A Spiral *Line* 16
Scales *for Surveying* 60
Stations 99

T

Of Tetragonal *or square Figures* 7
A Triangle *equilateral, to frame upon a streight Line given*, &c. 15, 42
Theodolite, *the Use of* 70, 79, 88
A Trapezium *reduc'd into a Triangle* 120
Of Terrace-Walks, *their several Kinds* 151
—— *Proportions* 153, 185
—— *Figures of Terrace-Walks* 154, &c.
—— *Like a Fortification* 174

V

Of Vineyards 266
—— *Not so much Inclemency of the Air as ill Culture occasions bad Grapes* ibid.
—— *Planting and Culture* 267

SPECIAL ES-B
15095
V.2

GETTY CENTER LIBRARY

Ex Libris
Universitatis
Albertensis